U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-255 145

POLLUTION OF LAKE MICHIGAN AND ITS TRIBUTARY BASIN, ILLINOIS, INDIANA, MICHIGAN, AND WISCONSIN

ENVIRONMENTAL PROTECTION AGENCY

21 SEPTEMBER 1972

PB 255 145

Volume 1

MICHIGAN
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA

Fourth Session
September 19-21, 1972
Chicago, Illinois

CONFERENCE

Pollution of Lake Michigan and its Tributary Basin, Illinois, Indiana, Michigan, and Wisconsin

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U.S. ENVIRONMENTAL PROTECTION AGENCY

BIBLIOGRAPHIC DATA SHEET

1. Report No.

2.

3. Recipient's Accession No.
PB-255 145

4. Title and Subtitle
Pollution of Lake Michigan, and its Tributary Basin, Illinois, Indiana, Michigan, and Wisconsin. Proceedings of Conference, Session (4th), Held at Chicago, Illinois, on September 19-21, 1972

5. Report Date
21 Sep 72

6.

7. Author(s)

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
Environmental Protection Agency, Washington, D. C.
Water Quality Office

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstracts

The meeting was held to discuss the current problems faced by state and federal agencies charged with the duty of protecting Lake Michigan from the deleterious effects of the various types of pollution.

17. Key Words and Document Analysis. 17a. Descriptors

*Water pollution,
*Lake Michigan,
*Meetings,

Streams,
River basins,
Water treatment,
Phosphorus inorganic compounds,
Pesticides,
Chlorides,
Thermal pollution,
Personnel,
Objectives,
Recommendations,
Government policies,
Regional planning,
Wisconsin,
Illinois,
Indiana,
Michigan,
State government,
National government,
Surveys,
Standards.

17b. Identifiers/Open-Ended Terms

*Tributaries,
Standards compliance.

17c. COSATI Field/Group 13 B

18. Availability Statement
National Technical Information Service
Springfield, Va.

19. Security Class (This Report)
UNCLASSIFIED

20. Security Class (This Page
UNCLASSIFIED

21. No. of Pages
625

22. Price
16.25/2,25

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21. **Number of Pages.** Insert the total number of pages, including introductory pages, but excluding distribution list, if any.

22. **NTIS Price.** Leave blank.

FOURTH SESSION OF THE CONFERENCE
IN THE MATTER OF POLLUTION OF LAKE MICHIGAN
AND ITS TRIBUTARY BASIN
IN THE STATES OF
WISCONSIN, ILLINOIS, INDIANA, AND MICHIGAN

VOLUME I

Bal Tabarin Room
Sherman House
Chicago, Illinois
September 19, 1972

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614 - 846-3682

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Fourth Session of the Conference in the Matter of Pollution of Lake Michigan and Its Tributary Basin, in the States of Wisconsin, Illinois, Indiana, and Michigan, held in the Bal Tabarin Room of the Sherman House, Chicago, Illinois, on Tuesday, September 19, 1972, at 9:30 a.m.

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PROCEEDINGS

OPENING STATEMENT
BY
FRANCIS T. MAYO

MR. MAYO: Ladies and gentlemen, the conference is now open. I am Francis T. Mayo, Regional Administrator, Region V of the Environmental Protection Agency. I am the representative of Administrator Ruckelshaus.

This is the Fourth Session of the Conference in the Matter of Pollution of Lake Michigan and Its Tributary Basin in the States of Wisconsin, Illinois, Indiana, and Michigan.

At this point, I want to acknowledge that it has been the custom of the conference to hear statements from Federal, State, or local elected officials immediately following the opening statement of the chairman. If any one of those elected officials desires to make a statement, please contact Mrs. Jan Mason, the lady standing in the aisle at the moment.

The first session of this conference was held in 1968, in accordance with a request from the Honorable Otto

Kerner, Governor of Illinois, as well as on the basis of reports, surveys, and studies by the Secretary of the Interior. Authority for the calling of such a conference came from Section 10 of the Federal Water Pollution Control Act (now 33 U.S.C. 1150). The second and third sessions of this conference were held during the years 1969-1971.

This meeting is being held to discuss the current problems that are being faced by those State and Federal agencies charged with the duty of protecting Lake Michigan from the deleterious effects of the various types of pollution. Several topics of major concern have been placed on the agenda for discussion. These major topics are discussed as follows:

1. The first major item addressed is a review of the status of compliance by the various dischargers with the recommendations of previous conferences, involving adequate treatment, 80 percent total phosphorus removal from municipal wastes, industrial waste control, and elimination of pollution from combined sewer systems.

2. The second major item is the report of the Phosphorus Technical Committee.

3. Another major problem to be reviewed is the Pesticides Committee report. This committee was initiated as a result of several recommendations from previous

conferences. The committee has been expanded to include a study of PCBs, phthalates, and heavy metals. The committee's findings on all of these items will be reported on at this conference.

4. The chlorides report by the Federal conferee is a fourth area of importance. The report was requested by the conferees and will include a discussion of present water quality in the lake, the effect of chlorides on the control of total dissolved solids, and possible future action to control chloride input to the lake.

5. The final scheduled item of major importance includes the thermal question. I have requested each State to report on programs they have instituted, and regulations they have adopted to implement, to the fullest extent, the recommendations arising from previous sessions of the Lake Michigan Enforcement Conference.

It is proper to note here that any additional areas of interest can be discussed after treatment of the major topics. Those wishing to discuss additional areas should inform their respective State representative of the subjects they wish to comment upon.

It is our goal that each topic be discussed sufficiently by the conferees and participants of this conference to ensure that appropriate information is presented upon which proper conclusions and recommendations can be heard.

Both the States and the Federal Government have interrelated and interlocking responsibilities under the Federal Water Pollution Control Act. The States have primary rights and responsibilities for taking action to abate and control pollution. It is the duty of this conference to recommend appropriate action to be taken by the States of Wisconsin, Illinois, Indiana, and Michigan, regarding pollution abatement in Lake Michigan and to encourage these States to act uniformly within reasonable time limits.

Under the same Act, the Federal Government is charged with specific responsibilities in the field of water pollution control in connection with pollution of interstate and navigable water. This Act provides that pollution of interstate or navigable waters that endangers the health or welfare of any person shall be subject to abatement. This applies whether the matter causing or contributing to the pollution is discharged directly into such waters, or reaches such waters after discharge into a tributary.

The parties to this meeting are the official State water pollution control agencies of Michigan, Illinois, Indiana, and Wisconsin. The conferees representing the

State water pollution control agencies at this conference are at the table.

It is appropriate, at this point, to ask the conferees to introduce themselves and those who are accompanying them at the head table. And I would like to start on my left with the State of Illinois.

MR. BLOMGREN: My name is Carl Blomgren of the Illinois Environmental Protection Agency.

MR. PURDY: I am Ralph Purdy, the Executive Secretary of the Michigan Water Resources Commission; and with me I have Dr. Kitchel, the immediate past Chairman of the Water Resources Commission; and Carlos Fetterolf, our departmental scientist.

MR. MAYO: Excuse me a moment, Mr. Miller.

Excuse me, Bill.

MR. BLASER: I am Bill Blaser, Director of the Illinois Environmental Protection Agency.

MR. MAYO: Mr. Miller.

MR. MILLER: My name is Perry Miller; I am Technical Secretary of the Indiana Stream Pollution Control Board; and I have with me Oral Hert, who is Director of the Division of Water Pollution Control of the Indiana State Board of Health.

MR. FRANGOS: My name is Thomas Frangos, and I am the Administrator of the Division of Environmental Protection of the Wisconsin Department of Natural Resources. With me is Mr. Oliver Williams, who is the Assistant Administrator.

MR. MAYO: The U.S. Environmental Protection Agency is represented by Mr. James McDonald, on my left, who is the Federal conferee. Accompanying him is Mr. Dale Bryson of the Office of Enforcement, Region V, U.S. Environmental Protection Agency.

Participation in the conference is open to all conferees, their invitees, and interested parties wishing to make a statement. For the purpose of assuring orderly presentation, those members of the public wishing to make a statement are requested to advise the State representatives of the State in which they reside. Each State will be permitted to manage its own time and order of presentation according to the topic at hand.

Written statements may be presented on behalf of persons not able to be physically present. Depending on the nature and length of the statement, the Chair may decide to introduce such a statement into the record as if read.

The Chair and the official conferees will question the participants and each other. In the interest of running the most orderly and productive conference possible, cross examination and direct questioning of participants by others will not be permitted.

A record and verbatim transcript of the meeting is being made by Mrs. Marilyn Hall. This is being made for the purpose of aiding us in preparing a summary and also for providing a complete record of what is said here. If any interested parties wish to purchase a copy of the transcript, they should make arrangements directly with the reporter.

An agenda for this conference has been made available to all interested parties and reflects discussion with all conferees. It is my desire to address each agenda item separately and completely so that tentative conclusions and recommendations can be reached prior to moving on. You will note on the agenda that we will enter into an executive session to finalize any conclusions and recommendations.

Following the comments of any elected officials who wish to address the conference, I will call on Mr. Dale Bryson, Chief of the Enforcement Branch, Region V of the Environmental Protection Agency, who will coordinate the Federal presentation.

Are there any elected officials who desire to address the conference?

I understand that Mr. Wallace Poston of the city of Chicago has a statement on behalf of the mayor.

Are you prepared to make a statement now, Mr.

Poston?

MR. POSTON: Yes, sir.

STATEMENT OF H. W. POSTON,
COMMISSIONER, DEPARTMENT OF ENVIRONMENTAL CONTROL, CITY OF CHICAGO, ILLINOIS

MR. POSTON: Thank you, Mr. Mayo.

I am H. W. Poston, Commissioner of the Department of Environmental Control for the city of Chicago. Mayor Daley has asked that I make this statement on his behalf. He expresses his regrets that he is unable to be here this morning.

Mr. Mayo, distinguished members of the conference, ladies and gentlemen. It is a pleasure on behalf of the people of Chicago to welcome the reconvening of the Lake Michigan Enforcement Conference. The future of the city depends to a large degree on the continued purity of Lake Michigan which is our source of drinking water as well as adding to recreational and aesthetic features of the city.

Therefore at this Fourth Session we shall be listening closely to the progress reports presented here by the States of Illinois, Wisconsin, Indiana, Michigan, and those reports by the Federal Environmental Protection Agency.

We await the recommendations that will be presented as a result of this important conference.

The August 10, 1972, report of the Phosphorus Technical Committee to the Lake Michigan Enforcement Conference concludes that the discharge of phosphorus at present levels has an adverse effect on Lake Michigan. The Technical Committee, as you know, is composed of representatives from the Federal Government and each of the States participating in this conference. The Technical Committee report also states that the "loadings of phosphorus to the lake should be decreased to the lowest level consistent with engineering feasibility and economic reasonableness."

In light of these findings, I urge this conference to adopt uniform laws to control phosphates in detergents. As you are well aware, Chicago's ban on phosphates in most detergents became effective in July of this year. Although it still is too early to determine what the ultimate effects will be, the July 1972 sample from the Metropolitan Sanitary District showed a lower content of phosphorus compared to the previous month in all three major treatment plants.

The city of Chicago does not add to the pollution of the lake since we do not discharge wastes into the lake but the other communities do.

We remain convinced that the removal of phosphates at the source is the fastest, most economical and the best solution to the problem.

We have been pleased with the cooperation of most manufacturers, store owners and managers and consumers in conforming to the local ban on phosphates in detergents.

The third annual report of the Council on Environmental Quality reports that the Great Lakes Basin has 2,191 more polluted miles of streams than were reported in its 1970 findings. The need for action in reducing pollution from phosphates is obvious.

An 18-month engineering study seeking solutions to the combined sewer overflow problem and flooding after storms in areas drained by Illinois waterways and the canal system was completed recently. The study, undertaken by the city of Chicago, the State of Illinois, Cook County, and the Metropolitan Sanitary District, offers the most economical and environmentally acceptable plan in solving these problems. It calls for the construction of large diameter tunnels, 200 or more feet below ground, paralleling the existing river and canal system. It would also utilize existing quarries.

This program, costing nearly $1.25 billion, will, when coupled with scheduled improvements by the Metropolitan Sanitary District, meet the new strict pollution standards set for the State waterways. The plan also will eliminate the need for releasing river water into Lake Michigan in times of unusually heavy rains.

Because of the urban growth of the Metropolitan area and the related flooding, the necessity of releasing river water to Lake Michigan at the Wilmette Gates, the mouth of the Chicago River and the Calumet River, is on the increase. It is essential that steps be taken immediately to implement this plan which will eliminate the need to divert excess stormwaters into Lake Michigan.

The work of developing this plan is a good example of the cooperative effort of the State of Illinois, Cook County, the Metropolitan Sanitary District of Greater Chicago, and the city of Chicago, in approaching the metropolitan problem of protecting our valuable waterways and Lake Michigan.

The standards set for pleasure craft by the Federal Environmental Protection Agency are not sufficient to cut down on sewage discharges from boats. They would allow the continuation of discharges on existing vessels indefinitely. All owners are required to do is install devices that merely grind up and chlorinate the human waste. The States bordering Lake Michigan should insist on the more stringent measures which prohibit any discharge of waste from any vessel.

Since 1967, Chicago has required retention tanks on all vessels, including pleasure crafts, using its harbors. It has also required boat owners to dispose of these wastes at pumpout stations.

One of the benefits of these four-State conferences has been the enactment by the States of Illinois, Indiana, Michigan, and Wisconsin of laws requiring holding tanks. It has been the recommendations and findings of these conferences which have benefited all the users of Lake Michigan. We believe that strict regulations are necessary and we urge Federal adoption. Strict Federal regulations regarding retention tanks should apply particularly in matters of interstate commerce.

It is our hope that this conference will make recommendations and adopt rules which will have a beneficial impact on Lake Michigan as a whole.

Our own studies of water quality -- taken over a 25-year period -- established a trend of deterioration. But since 1968 we have noted improvement particularly in the bacteriological area. However in the chemical area there still is an increase of phosphates, chlorides, and sulphates. A more detailed report will be given at this conference later by the Chicago Department of Water and

Sewers.

At the conclusion of the first enforcement conference in 1968, it was noted that "Lake Michigan is a priceless natural heritage which the present generation holds in trust for posterity, with an obligation to pass it on in the best possible condition."

Let this first conclusion continue to be the watchword for this magnificent body of water.

I thank you.

MR. MAYO: Thank you, Mr. Poston.

Do the conferees have any questions or comments that they want to make regarding Mr. Poston's evidence?

MR. McDONALD: I have a question, Mr. Poston, on the ordinance that Chicago passed banning phosphates, that became effective on June 30 of this year.

MR. POSTON: Yes, sir.

MR. McDONALD: What reaction have you had from the housewives? You know we always hear on the phosphate-free ordinances that you are going to be plagued with complaints from the housewives. Has this happened here in the city of Chicago?

MR. POSTON: I think only one complaint has come to my attention from a housewife, and this particular complaint was from a resident of a suburban area complaining that there were no phosphates on the shelves of her grocery store and that she would like to have the opportunity to purchase such material.

MR. McDONALD: So since the enactment of the ordinance, you have had no real complaints at all.

MR. POSTON: No real complaints; that is correct.

MR. McDONALD: Thank you.

MR. PURDY: Mr. Poston, on the combined sewer overflow control program -- this is a rather massive program that is being developed -- do you have, at this time, a time schedule in which this program will be implemented?

MR. POSTON: I can't give you that time schedule exactly. As you may know, it will depend, I am sure, upon the Federal Government's ability to support with their funds construction.

MR. PURDY: You have preempted my next question because I was going to ask if Chicago was prepared to move forward on that project in the absence of a construction grant, and I think you have already answered that.

MR. MAYO: Are there any other questions from the conferees?

Thank you, Mr. Poston.

MR. POSTON: Thank you for the opportunity to be here. I am very happy to see many of my acquaintances at this meeting. I am sure that some very weighty decisions will be made at this meeting and much good can come from them.

MR. MAYO: Thank you.

Before moving into the first item on the agenda, I would like to recognize that we have with us this morning five waterworks specialists from the nation of Finland who are visiting with the staff of the Chicago Department of Waterworks and Sewers. We are pleased to have them join us this morning, and to share with us an interest in the items that are on the agenda.

As indicated in the opening statement, I am now going to call on Mr. Dale S. Bryson to begin the Federal presentation.

STATEMENT OF DALE S. BRYSON, DEPUTY DIRECTOR, ENFORCEMENT DIVISION, U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION V, CHICAGO, ILLINOIS

MR. BRYSON: Because the conference will be addressing separate and distinct topics, EPA's statement will reflect that same approach. I will be calling upon various people to present appropriate information at the proper time in the proceedings. In some instances, EPA will have a separate report such as on Status of Compliance, and in other cases our presentation will be included as part of a committee report.

The first item under consideration by the conferees is status of compliance. Assessment of status of compliance is the foundation of any conference such as this. Without appropriate monitoring of status of compliance, the conference becomes meaningless. At this point it is appropriate to remind this conference of the first conclusion made back in 1968. Mr. Poston has quoted that recommendation. That recommendation was that: "Lake Michigan is a priceless natural heritage which the present generation holds in trust for posterity, with an obligation to pass it on in the best possible condition." On the basis of this and other conclusions, a number of recommendations were decided upon and timetables set to accomplish the stated objectives. It is up to the regulatory agencies, State and Federal, to see that proper efforts are taken by the dischargers so that the recommendations are complied with. It follows naturally that proper enforcement actions must be taken should a discharger become recalcitrant.

Status of Compliance

The EPA has compiled detailed status of compliance information on the various municipal and industrial dischargers in the basin covered by the conference recommendations. We have also developed certain statistical information on the basis of current status of compliance with the conference recommendations. I think you will find this information quite interesting.

At the time the conference recommendations were established, water quality standards plans of implementation were also being placed into effect. On the basis of these items, the EPA has taken a number of enforcement actions within the Lake Michigan Basin.

At this time, I would like to call upon Mr. David Kee, Chief of our Compliance Section, to present a summary of the Federal enforcement actions in the basin and to present a summary of certain statistical information on status of compliance.

Mr. Kee.

STATEMENT OF DAVID KEE, CHIEF, COMPLIANCE SECTION, ENFORCEMENT DIVISION, U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION V, CHICAGO, ILLINOIS

MR. KEE: Thank you, Mr. Bryson.

If it is acceptable to you, Mr. Chairman, I will present both of my reports as if they were one since they are relatively brief.

MR. MAYO: Please proceed.

MR. KEE: The following is a summary report on the status of Federal enforcement actions against individual municipal and industrial dischargers in the Lake Michigan Basin.

Although these actions have not resulted as a direct legal consequence of this conference, they do supplement State enforcement efforts designed to meet the requirements of the conference. In large measure, water quality standards are similar to the enforcement conference requirements and it is as a result of standards violations that many of these actions have been initiated.

It is our belief that an assessment of this overall Federal enforcement program in the basin would be of interest both to the conferees and to the public.

Present Federal water pollution regulatory activities are based on two statutes: 1) the Federal Water Pollution Control Act; and 2) the 1899 River and Harbor Act, also known as the Refuse Act. Section 10 of the Water Pollution Control Act provides for 180-day notice proceedings and subsequent legal action, as necessary. Section 11 (b)(4) of the Act provides for criminal penalties in those instances in which there has been failure to notify appropriate authorities of an oil spill. Other sections of the Act are implemented under Coast Guard proceedings with Environmental Protection Agency assistance in certain instances.

Violations of the Refuse Act can result in either civil or criminal actions, depending on the nature and duration of the discharge. Civil actions are intended to correct ongoing pollutional discharges while criminal actions are initiated in instances of oil or hazardous material spills into navigable waters or in those cases where a discharger has failed to file a permit application for discharge to a navigable water.

To the present date, the Environmental Protection Agency has issued 180-day notices to eight dischargers in the Lake Michigan Basin. The recipients were the Gary Sanitary District, the city of Hammond, the Hammond Sanitary District, and the city of Whiting, in Indiana; the city of Sheboygan and the Green Bay Metropolitan Sewerage District, in Wisconsin; and two paper mills in the Green Bay area, Charmin Paper Products Company and American Can Company. While most of these cases are still in the negotiation phase, the Sheboygan and Charmin Paper Products matters have been settled with the establishment of detailed cleanup programs for both dischargers.

In addition to the above cases, the Environmental Protection Agency has referred seven matters to the U.S. Attorneys in the Districts which adjoin Lake Michigan for criminal prosecution under the Refuse Act. The subjects of these actions were United States Steel Corporation (Gary Works); United States Steel Corporation (South Works), in Chicago, Illinois; the Youngstown Sheet and Tube Corporation, East Chicago, Indiana; the American Oil Company, Whiting, Indiana; the Schafer Manufacturing Company, Union City, Michigan; Benton Harbor Malleable Industries, Benton Harbor, Michigan; Speedway Wrecking Company, Chicago; and Valentine Fisheries, Inc., Suamico, Wisconsin.

Civil actions have been filed against E. I. du Pont of East Chicago, Indiana, and the United States Steel Corporation of Gary, Indiana. Both of these civil cases are still in the pretrial stage.

A civil action has also been filed against the city of Whiting, Indiana, following a failure to reach an acceptable settlement during the 180-day negotiating period.

In addition to these formal abatement actions, the Environmental Protection Agency has moved with the States to obtain voluntary commitments to acceptable cleanup programs as an alternative to court action when an industry or municipality adopts a cooperative attitude towards its responsibilities to the environment. At present, two of these voluntary agreements have been negotiated in the Lake Michigan Basin. They are the Scott Paper Company at Marinette, Wisconsin; and the Chicago and Northwestern Railway at Green Bay, Wisconsin; and many more are presently in the negotiation stage.

It should be recognized that in all the above-mentioned enforcement actions, cooperation between the States and the Environmental Protection Agency has been of importance. The preponderance of enforcement activity with respect to both enforcement conference requirements and water quality standards has been done by the States. There has, however, been an increasing Federal role within the Lake Michigan Basin which has paralleled the growth of Federal enforcement activity nationally.

In summary, the story of Federal enforcement in the Lake Michigan Basin is one of a steadily increasing tempo with more actions filed in the last year than in all previous years combined. These actions have complemented State activity against recalcitrant polluters and have given substance to the joint Federal-State responsibility for the cleanup of Lake Michigan.

As Mr. Bryson has indicated, the review of the status of compliance of the industrial and municipal waste sources in the Lake Michigan Basin with the conference requirements must be viewed as one of the most important tasks of this reconvening. In particular, the progress toward implementing the major four recommendations aimed at controlling pollution from individual point sources is the most significant measure of the success or failure of the conference in reversing the trend toward degradation in the lake.

These four recommendations (numbers 1, 2, 4 and 7) resulted from the first conference sessions in the spring of 1968 and called for the following:

1. A general upgrading of municipal waste treatment and an 80 percent reduction in total phosphorus reaching the lake by December 1972.

2. An upgrading of industrial waste treatment, also by December 1972.

3. The provision of continuous disinfection for municipal effluents by May 1969.

4. The control of pollution from combined sewers by July 1977.

If the schedules established in 1968 had been adhered to, the next few months of 1972 would have seen a period of significant reductions of the levels of phosphorus and industrial wastes entering Lake Michigan and its tributary basin. However, the massive amount of schedule slippage in the implementation of the phosphorus and industrial cleanup programs has dimmed the prospect that those areas of the lake presently most severely degraded, the Green Bay and Southern Lake Michigan areas, will soon enjoy enhanced water quality.

As indicated in Table 1 (See p. 24) of this report, only 53 out of 145 waste sources serving about half of the total population subject to the phosphorus removal requirement are presently in final compliance or on schedule to meet the deadline. That the percentage in compliance is even this high is due largely to the efforts of one community, the city of Milwaukee, Wisconsin, the largest city in the Lake Michigan Basin, and one of the first to provide phosphorus removal. Twelve communities in the State of Indiana with more than 60 percent of the State's population in the basin needing phosphorus control are behind schedule.

It is our present understanding that both Federal installations subject to the requirement will provide interim phosphorus removal during the period prior to their connection to the North Shore Sanitary District. A list of the 92 dischargers behind schedule has been appended

TABLE I

LAKE MICHIGAN ENFORCEMENT CONFERENCE

SUMMARY OF PHOSPHORUS REMOVAL

STATE	SUBJECT TO REQUIREMENT		IN COMPLIANCE		ON SCHEDULE		BEHIND SCHEDULE	
	Sources	Served Population	Sources	Served Population	Sources	Served Population	Sources	Served Population
Illinois	7	114,000 100%	1	65,000 57%	6	49,000 43%	0	0 0%
Indiana	18	586,323 100%	3	32,370 6%	3	188,600 33%	12	365,353 61%
Michigan	75	1,353,823 100%	6	216,312 16%	23	641,297 47%	46	496,214 37%
Wisconsin	43	1,834,383 100%	6	949,690 52%	5	53,630 3%	32	831,063 45%
Federal Installations	2	45,000	0	0 0%	0	0 0%	2	45,000 100%
BASIN TOTAL	145	3,933,529 100%	16	1,263,372 32%	37	932,527 24%	92	1,737,630 44%

to this report as Table 6, and that appendix is available.

The second compliance requirement is for industrial waste dischargers, and of the 76 sources identified as influencing Lake Michigan water quality over three-fourths are in compliance or on schedule. Table 2 (See p. 26) provides summary information on the compliance of these dischargers and Table 3 (See p. 27) identifies those industrial polluters who are less than 1 year and more than 1 year behind schedule.

At this time I would like to turn to Table 3 and specifically identify for the record each of the 16 industrial waste sources which are behind schedule. In the column entitled "Less Than One Year Behind," in the State of Illinois, we have the Fansteel Metallurgical Corporation of North Chicago. In Wisconsin, we have the Anaconda American Brass Company, Kenosha; the Badger Paper Mills, Peshtigo; Bergstrom Paper Company, Neenah; the Appleton Paper Company, at Combined Locks; the John Strange Paper Company, Menasha; the Kimberly Clark facilities at Neenah; the Scott Paper Company at Oconto Falls; and the Scott Paper Company at Marinette.

In the listing of those "More Than One Year Behind" schedule, we have the United States Steel Corporation (South Works), Chicago, Illinois; the United States Steel Corporation, Waukegan Works; E. I. du Pont, East Chicago,

TABLE 2

LAKE MICHIGAN ENFORCEMENT CONFERENCE

SUMMARY OF INDUSTRIAL WASTE CONTROL

STATE	SUBJECT TO REQUIREMENT	IN COMPLIANCE	ON SCHEDULE	BEHIND SCHEDULE
Illinois	5	2	0	3
Indiana	28	26	0	2
Michigan	5	4	1	0
Wisconsin	38	17	10	11
BASIN TOTAL	76 100%	49 64%	11 15%	16 21%

TABLE 3

LAKE MICHIGAN ENFORCEMENT CONFERENCE

INDUSTRIAL WASTE SOURCES BEHIND SCHEDULE

STATE	LESS THAN ONE YEAR BEHIND	MORE THAN ONE YEAR BEHIND
Illinois	Fansteel Metallurgical Corp. (North Chicago)	U.S. Steel (Chicago) U.S. Steel (Waukegan)
Indiana	None	E.I. duPont (East Chicago) U.S. Steel (Gary)
Michigan	None	None
Wisconsin	Anaconda American Brass Co. (Kenosha) Badger Paper Mills (Peshtigo) Bergstrom Paper Co. (Neenah) Appleton Paper Co. (Combined Locks) Strange Paper Co. (Menasha) Kimberly Clark (Neenah) Scott Paper Co. (Oconto Falls) Scott Paper Co. (Marinette)	American Can Co. (Green Bay) Charmin Paper Products (Green Bay) Consolidated Paper (Appleton)

Indiana; United States Steel at Gary, Indiana. And in Wisconsin, we have the American Can Company at Green Bay; the Charmin Paper Products Company also at Green Bay; and the Consolidated Paper Company in Appleton.

It is noted that of the seven dischargers more than 1 year behind schedule, four have been the subjects of Federal enforcement actions. Of the remaining three, the United States Steel (South Works) in Chicago has agreed to install a closed system by October 1975 in settlement of a case brought by the State of Illinois and the Chicago Metropolitan Sanitary District. Consolidated Paper Company of Appleton, Wisconsin, and United States Steel, Waukegan Works, are presently under active evaluation by the Environmental Protection Agency's Enforcement Division.

The status of recommendation number 4 which required continuous disinfection of municipal wastes is brighter, as would be expected in the case of a deadline which is already more than 3 years past. Only four of 160 communities still fail to provide this basic health protection. They are Ashley, Goshen, and South Bend, Indiana; and Clintonville, Wisconsin. Unfortunately, one of the cities in this category, South Bend, Indiana, is among the largest in the Lake Michigan Basin.

Because the control of pollution from combined sewers is subject to only a final compliance date of July 1977, it is not possible to assess the present status of this program in a detailed manner.

Twenty communities with a total population of over 1 million have been identified as contributing to this problem. Clearly identified interim dates by which the dischargers and the regulatory agencies could monitor this program is the primary change needed here. Although a deadline 5 years distant appears to be generous, the complexity and expense of solving combined sewer discharges mandates that early attention be afforded this problem. Providing interim progress milestones now will ensure that pressure is brought to bear at all levels of government to address this issue.

Recommendations

In view of the present status of compliance with the four conference requirements outlined above, the Environmental Protection Agency recommends the following:

1. All sources of phosphorus input to Lake Michigan subject to the phosphorus removal deadline of December 1972, which are now behind schedule, should be required to utilize interim facilities to effect the maximum possible phosphorus reduction by the deadline date. The Environmental Protection Agency and the States should issue

a joint report by December 31, 1972, outlining the progress or lack of it being made by each discharger and the status of Federal or State enforcement action under way.

2. Industrial waste sources which are behind schedule and which have not been subjected to enforcement action resulting in an acceptable cleanup program should have such action initiated without delay. The Environmental Protection Agency and the States should issue a joint report detailing the status of action taken against each of the recalcitrant polluters listed in Table 3. This report should be issued by December 31, 1972, which is the final deadline for industrial waste control.

3. Interim disinfection facilities should immediately be installed at all four municipalities still in violation of the May 1969 final compliance date.

4. Each community subject to the combined sewer control recommendation (No. 7) which has not already done so should submit by July 1, 1973, a detailed implementation plan for attaining compliance. The plan should contain the following as a minimum: (1) A comprehensive report covering (a) a determination of the scope of the problem including a quantification of runoff volume and an assessment of the nature of pollutants from storm flows; (b) a delineation of the areas involved in the problem; (c) a staged program for

addressing higher priority areas first; (d) an identification of specific engineering solutions with reference to the current technology of combined sewer overflow abatement; (e) an estimated cost of the identified abatement method for each area, and; (2) Staged interim progress dates for the following tasks: (a) submit final plans (last stage no later than December 1974); (b) start construction (last stage no later than December 1975).

Mr. Chairman, that is the end of my statement. I would like to enter a copy of the detailed status of compliance listing into the conference record at this time, along with the tables which accompanied my oral presentation.

(Tables 4, 5 and 6 and the Status of Compliance with Lake Michigan Enforcement Conference Requirements report follow in their entireties.)

TABLE 4

LAKE MICHIGAN ENFORCEMENT CONFERENCE

MUNICIPALITIES IN VIOLATION OF MAY 1969 DISINFECTION DEADLINE

STATE	MUNICIPALITY
Illinois	None
Indiana	Ashley Goshen South Bend
Michigan	None
Wisconsin	Clintonville

TABLE 5

LAKE MICHIGAN ENFORCEMENT CONFERENCE

SUMMARY OF COMBINED SEWERS PROBLEM

STATE	SUBJECT TO REQUIREMENT		IN COMPLIANCE	
	Sources	Served Population	Sources	Served Population
Illinois	2	40,000	0	0
Indiana	2	185,200	0	0
Michigan	3	241,000	0	0
Wisconsin	14	858,595	1	2,000
BASIN TOTAL	21	1,324,795 100%	1	2,000 .2%

TABLE 6

LAKE MICHIGAN ENFORCEMENT CONFERENCE

SOURCES BEHIND SCHEDULE IN PHOSPHORUS REMOVAL

ILLINOIS

None

INDIANA

Angola
Chesterton
Crown Point
East Chicago
Gary
Goshen
Hobart
LaGrange
Michigan City
Mishawaka
Nappanee
Whiting

MICHIGAN

Albion
Allegan
Andrews University
Battle Creek
Berrien Springs
Big Rapids
Boyne City
Bronson
Cadillac
Charlotte
Constantine
Delphi Twp.
Dowagiac
Eaton Rapids
Fremont
Gladstone
Grand Haven
Grand Ledge
Grandville
Hartford
Hillsdale
Ionia
Iron Mountain-Kingsford
Iron River
Lansing
Lowell
Ludington
Manistee
Manistique
Marshall
Mason
Menominee
Michigan Reformatory
New Buffalo
Niles
Norway
Otsego
Paw Paw
Plainwell
Portland
St. Johns
South Haven
Spring Lake
Vicksburg
Wyoming
Zeeland

WISCONSIN

Algoma
Appleton
Berlin
Chilton
Clintonville
DePere
Fond du Lac
Germantown
Green Bay MSD
Kaukauna
Kenosha
Kewaunee
Kiel
Kimberly
Little Chute
Manitowoc
Milwaukee-South Shore
New London
North Fond du Lac
Oshkosh
Peshtigo
Plymouth
Portage
Racine
Ripon
Shawano
Sheboygan
Sheboygan Falls
Sturgeon Bay
Thiensville
Two Rivers
West Bend

FEDERAL INSTALLATIONS

Fort Sheridan
Great Lakes Naval Training Center

STATUS OF COMPLIANCE
WITH
LAKE MICHIGAN ENFORCEMENT CONFERENCE
REQUIREMENTS

ILLINOIS DISCHARGERS

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

August 1, 1972
Illinois District Office

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS
ILLINOIS MUNICIPALITIES						
NSSD - North Chicago Plant (Lake County)	Lake Michigan	4, 6		6 A 1967 B 1967 C 1-70 D 10-70 E 11-70 F 9-71 G 7-72 4 G 12-31-72	6 A = B = C = D = E 1968 F = G O 4 G	1 Yes 2 Yes 3 Yes
NSSD - Lake Forest Plant (Lake County)	Lake Michigan	3, 4		3 A 1967 B 1967 C 6-69 D 1969 E 1968 F 1-70 G 7-72 4 G 12-31-72	3 A = B = C = D = 11-69 E = 1968 F = G O 4 G	1 Yes 2 Yes
NSSD - Lake Bluff (Lake County)	Lake Michigan	3, 4		3 A 1967 B 1967 C 12-69 D 6-70 E 1968 F 9-70 G 7-72 4 G 12-31-72	3 A = B = C = C = E = 1968 F = G 4 G	1 Yes 2 Yes

A - Retain engineers.
B - Submit preliminary engineering report.
C - Initiate detailed engineering plans and specs.
D - Submit detailed engineering specifications.
E - Arrange financing.
F - Initiate construction.
G - Complete construction and place in full-time operation.

COMMENTS AND/OR REASONS FOR DELAY

North Chicago Plant: Separate Sewer, P.E. 20,000, Present treatment is secondary and chlorination 6-The North Chicago Plant is going to be a pre-treatment facility for the new Gurnee Plant. Completion of the Gurnee Plant is scheduled for February 1974, and it will discharge into the Des Plaines River. Construction of the interceptor which will divert wastes from the North Chicago Plant to the Gurnee Plant was delayed due to litigation concerning bond issue and Gurnee Plant zoning difficulties. However, as of July 1, 1972, the interceptor is 12% complete.

4-State ordered North Chicago Plant to use alum in process for phosphorus removal by January 1, 1973. As of July 1, 1972 construction is 60% complete.

Lake Forest Plant: Separate Sewers, P.E. 8,000, present treatment is primary and chlorination.

3-Wastes from the Lake Forest Plant are to be diverted to the Clavey Road Plant which will be completed November 1974. State advanced the completion date of Lake Forest secondary treatment or the equivalent to Jan. 1971. As of July 1, 1972, the pumping station is 99% complete. The interceptor has been completed.

4-Construction of facilities for phosphorus removal, required by Jan. 31, 1972, is on schedule.

Lake Bluff Plant: Separate Sewers P.E. 1,400, Present treatment is primary and chlorination.

3-Wastes from Lake Bluff Plant are to be diverted to Clavey Road Plant which will be completed November 1974. State advanced the completion date of Lake Bluff secondary treatment or the equivalent to August 1971. The Force main and sewer, section 1 (to Skokie sewer), is 92% complete as of July 1, 1972. Section 2 (Skokie to Middle Fork) is presently under design.

4-Construction of facilities for phosphorus removal, required by Jan. 31, 1972 is on schedule.

KEY: [illegible] Preliminary Plans (FP) Final Plans (F) Financing (C) Construction — STATUS OF COMPLIANCE: (x) Ahead of schedule (=) On Schedule (o) Behind Schedule (Less than 1 year) (OO) Behind Schedule (Over 1 year) (*) Unilateral Extension Given by State — REMEDIAL NEED: (1) Sample &/or Report (2) Disinfection (3) Secondary Treatment or Equivalent (4) Phosphorus or Nutrient Removal (5) New or Improved Trt. (6) Plant Expansion (7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (Cn) Cyanide, (Fe) Iron, (M) Metals, (N) [illegible], Oil, (O.D.) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor, (8) Connect to Municipal System (9) Separation or Control of Combined Sewers (10) Storm Sewer Treatment (11) Outfall to Clear Water (12) [illegible] (13) Adm. to Treatment (14) Improve Operation (15) Evaluate Present Facilities (16) Reduction of all [illegible] Constituents (17) Advanced Waste Treatment

GREAT LAKES REGION

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August I, 1972

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

ILLINOIS DISTRICT OFFICE

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
ILLINOIS MUNICIPALITIES (Continued)				3			Park Avenue Plant: Separate Sewers, P.E. 6,000, Present treatment is primary and chlorination.
NSSD Park Avenue Plant Highland Park (Lake County)	Lake Michigan	3,4		A B C D 10-70 E F G 7-72	A = B = C = D = 10-70 E = 1968 F = G 0	1 Yes 2 Yes	3-Wastes from Park Avenue Plant are to be diverted to Clavey Road Plant which will be completed November 1974. Construction of protection works for the interceptor sewer has started. 4-Construction of facilities for phosphorus removal, required by 12-31-72, is on schedule.
				4 G 12-31-72	4 G		Ravine Drive Plant: Separate sewers, P.E. 4,500, Present treatment is primary and chlorination.
NSSD - Ravine Ave. Plant Highland Park (Lake County)	Lake Michigan	3,4		A 1967 B 1967 C 9-69 D 4-70 E 1968 F 7-70 G 7-72	A = B = C = D · 10-70 E = 1968 F = G 0	1 Yes 2 Yes	3-Wastes from Ravine Drive Plant are to be diverted to Clavey Road Plant which will be completed November 1974. State advanced the completion of Ravine Drive secondary treatment or the equivalent to Sept. 1971. Construction of protection works for the interceptor sewer has started. 4-Construction of facilities for phosphorus removal, required by 12-31-72, is on schedule.
				4 G 12-31-72	4 G		
NSSD - Cary Avenue Plant Highland Park (Lake County)	Lake Michigan	3,4		3A 1967 B 1967 C 9-69 D 4-70 E 1968 F 7-70 G 7-72	A = B = C = D 8-70 E = 1968 F 10-70 G	1 Yes 2 Yes	Cary Avenue Plant: Separate Sewers, P.E. 6,500, Present treatment is primary and chlorination. 3-Wastes from Cary Avenue Plant are to be diverted to Clavey Road Plant which will be completed November 1974. State advanced completion date of Cary Avenue secondary treatment or the equivalent to October 1971. Interceptor is 99% complete and and the pumping station is 83% complete as of July 1, 1972.
				4 G 12-31-72	4 G		4-Construction of facilities for phosphorus removal required by 12-31-72, is on schedule.

A - Retain engineers.
B - Submit preliminary engineering report.
C - Initiate detailed engineering plans and specs.
D - Submit detailed engineering specifications.
E - Arrange financing.
F - Initiate construction.
G - Complete construction and place in full-time operation.

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(0) On Schedule
(d) Behind Schedule (Less than 1 year)
(DD) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil [illegible], (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) [illegible] Clear Water
(12) [illegible]
(13) Adequate Treatment
(14) Improve Operation
(15) [illegible]
(16) Reduction of All [illegible] Limitations
(17) [illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

August 1, 1972

ILLINOIS DISTRICT OFFICE

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	[illegible]
ILLINOIS MUNICIPALITIES (Continued)							
NSSD - Gillette Avenue Sewer Bypass Waukegan (Lake County)	Lake Michigan	9		9 A B C D E F G 7-72	9 A = B = C = D = E = F = G 0		9-The Gillette Avenue sewer bypass will be sealed upon completion of the Waukegan Plant improvement which is scheduled for September 1973. Screening is installed. SWB-7 specifies stormwater control (Item 10) by July 1977.
NSSD - Water Street Sewer Bypass Waukegan (Lake County)	Lake Michigan	9		9 A B C D E F G 7-72	9 A = B = C = D = E = F = G 0		9-The Water Street Sewer Bypass will be sealed upon completion of Waukegan Plant improvement which is scheduled for Sept. 1973. IPCB ordered installation of screening devices by Sept. 1972. However, NSSD and A.G.'s office have not completed negotiations for required land and construction of screening facilities has not yet started. Chlorination to be provided. SWB-7 Specifies stormwater control (Item 10) by July 1977.
NSSD - Waukegan Plant Waukegan (Lake County)	Lake Michigan	4, 6		6 A 1967 B 1967 C 6-69 D 11-70 E 1968 F 3-71 G 7-72 4 G 12-31-72	6 A = B = C = D 00 E = 1968 F 00 G 0 4 G 9-1-71	1 Yes 2 Yes 3 Yes 4 Yes ..	Waukegan Plant: Combined and separate sewers, P.E. 74,500. Present treatment is secondary and chlorinated. 6-Though delayed by litigation, Waukegan Plant expansion is presently under construction with Sept. 1973 completion scheduled. Expansion includes full secondary treatment, plus overflow treatment. Advanced wastewater treatment is programmed and completion of plans is scheduled for August 1972. Treatment plant effluent will be pumped to the Des Plaines River. 4-Phosphorus removal is presently being provided through the use of $FECl_2$.

A - Retain Engineers.
B - Submit preliminary engineering report.
C.- Initiate detailed engineering plans and specs.
D - Submit detailed engineering specifications.
E.- Arrange financing.
F - Initiate construction
G - Complete construction and place in full-time operation.

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(-) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Additional Extension Given by State

REMEDIAL NEEDS
(1) Engineering Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Fac.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (SS) Suspended Solids,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Include Flow Data
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

August 1, 1972

LAKE MICHIGAN

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DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	CURRENT [illegible]
ILLINOIS INDUSTRIES							
U. S. Steel Corp. Waukegan Plant (Lake County)	Lake Michigan	7 (Fe, Acid, S)		A B C D E F G 12-68	A B C D 00 E 00 F 00 G 00	1 Yes	At Waukegan Department 1968 objectives to reduce discharge to Lake substantially met by the collecting and hauling of industrial wastes. At present, however, some industrial wastes are treated by settling and acid reduction with discharge to Lake Michigan. Sanitary wastes are discharged to the NSSD Waukegan Plant. At North Chicago Department 1968 objectives to reduce discharge to Lake substantially met by the collecting and hauling of industrial wastes. Some industrial wastes are discharged through storm sewer to Lake Michigan. Sanitary wastes are discharged to NSSD North Chicago Plant. New IPCB Rules and Regulations require heavy metal reduction for both departments by 12-31-73.
Abbott Laboratories North Chicago (Lake County)	Lake Michigan	14,7 (BOD, S)		A B C D E F G 7-72	A = B = C = D = E = F = G =	1 Yes 2 Yes	A permanent AWT facility was completed in 10/71. This facility does not handle all the flow. Combined waste stream and cooling water system in operation. Abbott is presently in compliance with SWB-7 requirements, however, new IPCB standards require additional tertiary removal by 12-31-74. Abbott is considering connection to the NSSD Gurnee Plant which will be completed in February 1974.

A - Retain engineers.
B - Submit preliminary engineering report.
C - Initiate detailed engineering plans and specifications.
D - Submit detailed engineering specifications.
E - Arrange financing.
F - Initiate consturction.
G - Complete construction and place in full-time operation.

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

August 1, 1972

Illinois District Office

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
ILLINOIS INDUSTRIES (Continued)							
Chicago Hardware and Foundry North Chicago (Lake County)	Lake Michigan						Industry closed.
Fansteel Metallurgical Corp. North Chicago (Lake County)	Pettibone Creek to Lake Michigan	7 (N)		A B C D E F G 7-72	A = B = C = D E F G 0	1 Yes	Company operates a CN waste collection system which consists of collection by water, evaporation, and residue disposal by scavenging. Fansteel discharges to storm sewers not in conformance with water quality objectives. Illinois EPA enforcement case concerning these is currently in process. Company considering eventual discharge of wastes to NSSD.
U.S. Steel Corp. South Works Chicago (Cook County)	Lake Michigan and Calumet River	7 (Fe, S,Oil)		A B C D E F G 12-68	A = B = C = D OO E OO F OO G OO	1 Yes	This discharge was required to be in compliance with Interstate Standards by 12/68. Final plans and specifications are still being prepared. Court order issued January 18, 1971: 1. Elimination of all cyanide, phenols and ammonias from plant discharges by Oct. 31, 1972. MSDGC reports this phase on schedule. 2. Completion of facilities for recycling wastes from South Mills of this plant by Oct. 31, 1974. 3. Completing this recycling process for Northside Mills by April 30, 1975. 4. Completing recycling installations for the West Mills by Oct. 31, 1975.

A - Retain engineers.
B - Submit preliminary engineering report.
C - Initiate detailed engineering plans and specs.
D - Submit detailed engineering specifications.
E - Arrange financing.
F - Initiate construction.
G - Complete construction and place in full-time operation.

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(O) Behind Schedule (Less than 1 year)
(OO) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) [illegible]
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

INDIANA DISCHARGERS

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GREAT LAKES REGION

Page 1 of 11

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

August 8, 1972

LAKE MICHIGAN

ILLINOIS DISTRICT OFFICE

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL STEPS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	[illegible]
INDIANA MUNICIPALITIES							
				4			
Angola	Pigeon Cr., Pigeon River	4 ,17		A	A =	1 Yes	
				B 2-1-71	B =	2 Yes	
				C 4-1-71	C =		
				D 9-1-71	D 11-15-71		
				E 12-1-71	E =		
				F 4-1-72	F O		
				G 12-31-72	G		
				17	17		
				G 1977	G		
Ashley	Turkey Cr. Pigeon R.	2		G 1969	GOO	1 Yes 2 No	
Chesterton	Little Calumet River, Burns Ditch	4		A 10-1-70	A =	2 Yes	Engineer retained but there is no apparent progress. * Hearing 12-14-71. Under ISPCB order, city filed an objection to implementation dates followed by full hearing 2-15-72. Final order issued at that time requiring schedule: D 4-30-72, F 7-31-72, G 12-31-72.
				B 2-1-71	B =		
				C 4-1-71	C =		
				D 9-1-71*	D 8-4-72		
				E 12-1-71	E O		
				F 4-1-72*	F O		ISPCB referred case to U.S. Attorney General 5-23-72 for noncompliance.
				G 12-31-72	G		

SYMBOL FOR DETAILED CONSTRUCTION SCHEDULE

- A Retain engineers.
- B Submit preliminary engineering report.
- C Start plans and specifications.
- D Submit plans and specifications.
- E Arrange financing.
- F Start construction.
- G Complete construction and full operation.

KEY: [illegible]
(--) [illegible] Plans
(P) Final Plans
(F) Financing
(U) Construction

[illegible]
(+) Ahead of Schedule
(o) On Schedule
(-) Behind Schedule (Less than 1 year)
(--) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL STEPS
(1) Sample Flow Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor.
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

June 26. 1972

LAKE MICHIGAN

ILLINOIS DISTRICT OFFICE

[illegible] & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	[illegible]
INDIANA MUNICIPALITIES (Continued)							
Cromwell	Turkey Cr., Elkhart R.	2,3,12		3 A 10-1-70 B 2-1-71 C 4-1-71 D 9-1-71 E 12-1-71 F 1-1-72 G 12-31-72	3 A = B = 4-16-69 C 00 D C E 0 F 0 G	1 Yes	
Crown Point	Beaver Dam Ditch, Deep R., Burns Ditch	4 , 17		A 10-1-70 B 2-1-71 C 4-1-71 D 9-1-71 E 12-1-71 F 4-1-72 G 12-31-72 17 G 7-77	A = B ? C ? D 00 E 00 F 0 G	1 Yes 2 Yes	Engineer retained and plans for sewers and plant addition submitted 2-70. Phosphorus removal not included. State sent letter reminding community of requirement. City directed engineer to proceed with study. *Under ISPCB order issued 1-28-72 for phosphorus removal: 6-30-72; 8-15-72; 11-15-72. Plans for phosphorus removal under way.
East Chicago	Grand Calumet River	4, 10, 17		4 A B C 10-1-70 D 7-1-71 E 11-1-71 F 1-1-72* G 12-31-72 10, 17 G As soon as practicable (ASAP)	4 A = B = C = D = E 0 F 0 G	1 Yes 2 Yes	Pilot projects are under way for AWT and demonstration project for storm sewer treatment supported by USEPA R&D grants. Final plans for phosphorus removal and AWT have been approved. Financing being considered. *ISPCB ordered phosphorus removal 1-28-72: F by 7-1-72: G by 12-31-72

KEY: CONSTRUCTION SCHEDULE
(A) Preliminary Plans
(B) Final Plans
(C) Financing
(D) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (Bod) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

Page 3 of 11

June 26, 1972

ILLINOIS DISTRICT OFFICE

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
INDIANA MUNICIPALITIES (Continued)							
East Gary	Burns	4		A	A =	1 Yes	Connected to Gary main sewer system.
	Ditch			B	B =	2 Yes	Project complete.
				C	C =		
				D	D =		
				E	E =		
				F	F =		
				G 12-72	G +		
				3	3		
Elkhart	St.	3, 4		A	A =	1 Yes	
	Joseph	6		B	B 1-70	2 Yes	
	River			C	C =		* New state schedule: "E" 8-1-70, "F" 9-1-70, "G" 12-31-71. Facility is under construction and will have phosphorus removal as part of the expansion. Project completion August 1972 anticipated.
				D	D =		
				E *	E 10-27-70		
				F *	F =		
				G 12-31-69 *	G 00		
				4	4		
				G 12-31-72	G		

KEY: CONSTRUCTION PHASE
[illegible] Preliminary Plans
[illegible] Final Plans
[illegible] Financing
[illegible] Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(−) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chlorine, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) [illegible]
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIRFMENTS

LAKE MICHIGAN

August 8, 1972

ILLINOIS DISTRICT OFFICE

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF CONSTRUCTION	STATUS OF COMPLIANCE ADM'T. REQUIREMENTS	[illegible]
INDIANA MUNICIPALITIES (Continued)							
				4	4		
Gary	Grand Cal.	4 , 10,		A	A =	1 Yes	The Indiana Stream Pollution Control Board
	River to	17		B	B =	2 No	May 1971 set the following dates:
	Indiana			C 10-1-70*	C =		*For phosphorus removal facilities, C by 10-31-71,
	Harbor			D 7-1-71	D =		F by 3-31-72, G by 12-31-72.
	Canal,			E 11-1-71	E 00		For advanced waste treatment facilities,
	Little			F 1-1-72*	F 0		C by 3-31-72, F by 12-31-72, G by 12-31-74.
	Calumet,			G 12-31-72*	G		For storm sewer treatment, submit time schedule
	River						and method of financing by 7-31-72.
	Burns			17	17		Information from letter of 10-21-71.
	Ditch			A	A =		Plans and specifications for modification of primary
				B	B =		treatment facilities and addition of phosphorus removal
				C	C		facilities approved by ISPCB May 17, 1972.
				D	D		180-Day Notice issued 7-27-72.
				E	E		
				F	F		
				G ASAP	G ?		
				10	10		
				A	A =		
				B	B =		
				C	C		
				D	D		
				E	E		
				F	F		
				G ASAP	G ?		

KEY: [illegible]
[illegible] Preliminary Plans
[illegible] Final Plans
[illegible] Financing
[illegible] Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) Use of Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (O.D.) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

June 26, 1972

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

ILLINOIS DISTRICT OFFICE

MUNICIPALITY NAME & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	[illegible]
INDIANA MUNICIPALITIES (Continued)							
Goshen	Elkhart River	2, 4 6		4, 6 A B 2-1-71 C 4-1-71 D 9-1-71 E 12-1-71 F 4-1-72* G 12-31-72	4, 6 A = B = C = D = E OO F O G	2 Partial 1 Yes	*Under ISPCB order for phosphorus removal; F by 7-1-72; G by 12-31-72. ISPCB order issued 1-28-72. Final plans approved 2-16-72.
Hammond	Lake Michigan (also to Illinois River System)	9,10		9, 10 A B C D E F G 12-31-70	9, 10 A B 12-69 C = D = E = F = G OO	1 Yes	Water Quality Standards require Needs 6 and 17 by 1972 for discharges to the Illinois River System. Plans and specs for plant expansion and a pilot AWT plant approved 10-20-70. Federal and State grants approved. Informal Hearing held 12-1-71. 180-Day Notice issued 10-12-71. On April 6, 1972, USEPA accepted the following schedule in satisfaction of the 180-Day Notice: Robertsdale Overflow Project — Interim Cl_2 7-1-72 Completion 10-15-72 Treatment Plant Expansion Facilities — Completion 12-7-73

(CONTINUED ON NEXT PAGE)

KEY: CONSTRUCTION PHASE
(A) Preliminary Plans
(B) Final Plans
(C) Financing
(D) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(O) Behind Schedule (Less than 1 year)
(OO) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, (O) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Reports
(13) Adequate Treatment
(14) Improved Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

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STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

June 26, 1972

ILLINOIS DISTRICT OFFICE

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	[illegible]
INDIANA MUNICIPALITIES (Continued)							
Hammond (continued)							(continued from page 5) AWT Facilities: Retain Engineer 5-16-72 Complete Design 2-15-73 Complete financing & start construction 8-15-73 Completion 2-15-75 Although Hammond has agreed to this schedule, there is a question as to the maintenance of sufficient financial reserves to initiate the AWT project.
Hobart	Deep River	4 ,17		4 A 10-1-70 B 2-1-71 C 4-1-71 D 9-1-71 E 12-1-71 F 4-1-72 G 12-31-72	4 A = B = C OO D O E O F O G	1 Yes 2 Yes	Preliminary plans for phosphorus removal, plant expansion and reduction of combined sewer bypassing approved 10-19-70. Hobart objected to ISPCB order on phosphorus removal, followed by full hearing on 2-15-72. Plans promised for June 1, 1972, not received as of 6-21-72.
				17 A B C D E F G 12-31-76	17 A = B C D E F G		

KEY: CONSTRUCTION PHASE
(A) Preliminary Plans
(B) Final Plans
(C) Financing
(D) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(O) Behind Schedule (Less than 1 year)
(OO) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

August 17, 1972

ILLINOIS DISTRICT OFFICE

[illegible]	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	[illegible]
INDIANA MUNICIPALITIES (Continued)							
Kendallville	Henderson Lake, N.Branch Elkhart River, St.Joseph River	4		A B C 5-1-70 D 9-15-70 E 12-1-70 F 1-1-71 G 9-15-71	A = B = C = D = E = F = G =	1 Yes 2 Yes	
LaGrange	Fly Creek, Pigeon River	4		A 10-1-70 B 2-1-71 C 4-1-71 D 9-1-71 E 12-1-71 F 4-1-72 G 12-31-72	A = B 4-5-71 C = D 5/1/72 E O F O G	1 Yes 2 Yes	* Under ISPCB orders; D by 4-30-72; F by 7-31-72; G by 12-31-72.
Ligonier	Elkhart River	3, 4 6		3,4,6 A 10-1-70 B 2-1-71 C 4-1-71. D 9-1-71 E 11-1-71 F 1-1-72 G 12-31-72	3,4,6 A = B = C = D = E = F = G =	1 Yes 2 Yes	

[illegible] (C) Construction

STATUS [illegible]: [illegible] (u) Behind Schedule (Less than 1 year) (UB) Behind Schedule (Over 1 year) (*) Unilateral Extension Given by State

REMEDIAL NEEDS: (1) Sewer Use Report (2) Disinfection (3) Secondary Treatment or Equivalent (4) Phosphorus or Nutrient Removal (5) New or Improved Trt. (6) Plant Expansion (7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, [illegible] (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor, (8) Connect to Municipal System (9) [illegible] Combined Sewers (10) Storm Sewer Treatment (11) [illegible] (13) Adequate Treatment (14) Improve Operation (15) Evaluate Present [illegible] (16) [illegible] (17) Advanced Waste Treatment

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August 8, 1972

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

ILLINOIS DISTRICT OFFICE

[illegible]	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF CONSTRUCTION	STATUS OF [illegible] REQUIREMENTS	[illegible]
INDIANA MUNICIPALITIES (Continued)							
Michigan City	Trail Creek	4, 10 17		4 A 10-1-70 B 2-1-71 C 4-1-71 D 9-1-71* E 12-1-71 F 4-1-72* G 12-31-72 10, 17 E F G ASAP *As soon as practicable.	4 A = B = C = D 7-28-72 E O F O G 10, 17 E = 12-1-70 F G ASAP	1 Yes 2 Yes	Plans and specifications approved for sanitary and storm sewer separation May 22, 1972. New state schedule for phosphorus removal: Final Plans 6-1-72 Start Construction 8-1-72 Complete Construction 11-1-72
Middlebury	Little Elkhart River	2,3,12		3 G 1977	3 G + 12-71	1 Yes 2 Yes	
Milford Junction	Turkey Cr., Elkhart R.	2,3,12		A B C D E 12-1-71 F 1-1-72 G 12-31-72	A = B = C = D = E O F O G	1 Yes	

[illegible]
[illegible] Plans
[illegible]
[illegible]
(G) Construction

STATUS OF [illegible]
(=) [illegible]
(+) [illegible]
(-) Behind Schedule (less than 1 year)
(BB) Behind Schedule (over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, , (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) [illegible]
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Definition of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

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STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

August 8, 1972

ILLINOIS DISTRICT OFFICE

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR PLANS FOR [illegible]
INDIANA MUNICIPALITIES (Continued)							
Mishawaka	St.Joseph River	4 ,6		4 A B C D E F G 12-31-72	4 A = B = C = D = E F G	1 Yes 2 Yes	New State schedule: B by 2-1-71; C by 4-1-71; D by 9-1-71; E by 12-1-71; F by 4-1-72.
				6 A B C D E F G 12-31-72	6 A = B C D E F G		
Nappannee	Trib. Turkey Cr. Elkhart R.	4		A B C D E F G 12-31-72	A = 3-71 B = C = D = 4-18-72 E O F O G	1 Yes 2 Yes	New State schedule: D by 4-30-72; F by 7-31-72.
Portage	Burns Ditch	2,4 , 13		2 A B C D E F G 12-70	2, A B 8-68 C = D = E 11-9-70 F G 6-72	1 Yes 2 Yes	
				4 G 12-31-72	4 G + 6-72		

KEY: CONSTRUCTION STAGES [illegible]
[illegible] Plans
[illegible] Final Plans
[illegible] Financing
[illegible] Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) Use of Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

August 8, 1972

ILLINOIS DISTRICT OFFICE

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
INDIANA MUNICIPALITIES (Continued)							
South Bend	St.Joseph River	4 ,6		A B C D 7-1-71 E 11-1-71 F 1-1-72 G 12-31-72	A B = C = D = E = F = G	1 Yes 2 No	Under construction, anticipate completion September 1973. Disinfection and phosphorus removal facilities being constructed with plant improvements.
Topeka	L.Elkhart River	2,3, 12		A 10-1-70 B 2-1-71 C 4-1-71 D 9-1-71 E 12-1-71 F 1-1-72* G 12-31-72	A = B = C = D + 5-11-70 E = F = G	1 Yes 2	*Start of construction date extended 120 days by State. Additional 60-day extension period granted during March 1972 board meeting. Under construction, completion anticipated April 1973.
Valparaiso	Salt Creek, Little Calumet R., Burns Ditch	4 ,6, 17		4,6 A B C 10-1-70 D 7-1-71 E 11-1-71 F 1-1-72 G 12-31-72 17 G 7-77	4,6 A B C = D + 11-13-70 E = F = G 17 G	1 Yes 2 Yes	Federal and State grants approved. Under construction--to 6.0 mgd including phosphorus removal. Completion anticipated by September 1972.

KEY. CONSTRUCTION UNITS
(--) [illegible] Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(U) Behind Schedule (Less than 1 year)
(UU) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) [illegible]
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities.
(16) Reduction of All Waste Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

Page 11 of 11

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

June 26, 1972

LAKE MICHIGAN

ILLINOIS DISTRICT OFFICE

DISCHARGER & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF CONSTRUCTION	STATUS OF COMPLIANCE WITH REQUIREMENTS	[illegible]
INDIANA MUNICIPALITIES (Continued)							
Whiting	Lake Michigan	9,10		A B C D E F G 12-31-70	A = B = C = D 11-15-71 E F G 00	1 Yes 2 Yes	Whiting is now discharging dry weather flow to the Hammond Sanitary District. The city was ordered by the State to treat and disinfect storm water overflow by 5-71. City to build its own STP and get out of the Hammond Sanitary District. Informal 180-Day Notice hearing held with USEPA on December 1, 1971. Financing problems have delayed implementation of plans for construction of separate treatment plant.

KEY: [illegible]
[illegible] Plans
[illegible]
[illegible]
[illegible]

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(-) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) [illegible]
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

June 26, 1972

LAKE MICHIGAN

ILDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
INDIANA INDUSTRIES							
Adolph Plating, Inc. East Chicago	Grand Cal. River						Plant closed 12-69.
American Maize Products Hammond	Lake Michigan	7 (BOD) 17		A 10-1-70 B 3-1-71 C 5-1-71 D 9-1-71 E 10-1-71 F 12-1-71 G 12-1-72	A = B = C = D = E = F = G =	1 Yes	Project completed during 1969. Advanced waste treatment facility to be completed 12-31-72.
American Oil Company Whiting	Lake Michigan	7 (BOD, Oil, S, TO) 17		A B C D E F G 12-31-70	A B C D E F G 12-31-70	1 Yes	Tertiary treatment consisting of flocculation and air flotation was constructed with assistance of USEPA R&D grant. Results show that design effluent limits are being met on the average. Studies are being made to establish ways to reduce periodic high values for BOD and suspended solids.
A.M. General Corp. (South Bend) or Kaiser Jeep, Inc.	St. Joseph River	7 (M)		G 12-69	G =	1 Yes	Diverted all flow to South Bend sewage treatment plant.

SYMBOL FOR DETAILED CONSTRUCTION SCHEDULE

- A Retain engineers.
- B Submit preliminary engineering report.
- C Start plans and specifications.
- D Submit plans and specifications.
- E Arrange financing.
- F Start construction.
- G Complete construction and full operation.

[illegible]

(b) Behind Schedule (Less than 1 year)
(10) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (Cn) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor.
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) [illegible]
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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Page 2 of 8

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

ILDO

DATE OF INFORMATION
August 8, 1972

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
INDIANA INDUSTRIES (Continued)							
Atlantic Richfield Co. East Chicago	Lake George Br. Indiana Harbor Canal	7 (BOD, Oil, S, TO)		G 12-68	G = 12-1-70	1 Yes	
Angola Reduction Co. Angola	Silver Lake St. Joseph River	3,7 (BOD, Oil, S)		3,7 A B C D E F G 12-69	3,7 A B C D = 7-70 E = F = 9-70 G = 11-70	1 Yes	
Cities Service Oil Company East Chicago	Grand Calumet River			A B C D E F G 7-1-71	A B C D E F = 6-70 G = 6-71	1 Yes	Plant to be closed 1-1-73.
Continental Can Co. Elkhart	Elkhart River						Mill was closed February 1971.

KEY: [illegible]
(A) [illegible] Plans
(B) Final Plans
(C) Financing
(D) Construction

STATUS OF COMPLIANCE
(•) Ahead of Schedule
(•) On Schedule
(●) Behind Schedule (Less than 1 year)
(BB) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Proposed Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

June 26, 1972

ILDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
INDIANA INDUSTRIES (Continued)							
E.I. DuPont deNemours & Co., Inc. East Chicago	Grand Calumet River	7 (Acid, S)		A B C D E F G 12-68	A = B = C = D = E = F = G 00	1 Yes	Facilities completed in 1968, judged inadequate by State. Meetings in July and November 1970 set additional controls needed. Company was to submit preliminary plans by March 1971, however, the submission of plans has not been made. U. S. Attorney filed civil action under the Refuse Act on February 19, 1971. EPA is providing technical assistance to the Justice Department on this case.
Gentner Packing Co. South Bend	Autin Ditch to Bowman Creek St.Joseph River	7 (BOD, S), 3		7, 3 A B C D E F G 12-31-69	7, 3 A = B = C = D = E = F = G 6-29-71	1 Yes	
Inland Steel Corp. Terminal Basin East Chicago	Ind.Harbor Canal and Lake Michigan	7 (Fe, S, Oil)		A B 12-66 C D 6-67 E F G 5-70	A = B = C = D = E = F = G 4-70	1 Yes	Facilities completed 4-70 being evaluated. Periodic high values being experienced. USEPA 24-hour sampling survey (March 8-9, 1972) showed high iron, CN and oil values. Additional waste controls needed. Plan of implementation being developed by State.
Inland Steel Corp. All Other Facilities East Chicago	Indiana Harbor Canal	7 (BOD, pH, CN, N,S, Oil)		A B 12-66 C D 6-67 E F G 12-68	A B C D E F G 10-68	1 Yes	State developing implementation plan for additional necessary waste controls.

KEY. Construction Schedule
(A) Preliminary Plans
(B) Final Plans
(C) Financing
(G) Construction

Status of Compliance
(+) Ahead of Schedule
(=) On Schedule
(-) Behind Schedule (less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

Remedial Needs
(1) [illegible] Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilit
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treat

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GREAT LAKES REGION

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STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

August 8, 1972

LAKE MICHIGAN

ILDO

DISCHARGER & LOCATION	RECEIVING WATERS	REMEDIAL STEPS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
INDIANA INDUSTRIES (Continued)							
Lehman Veal and Poultry Packers Wakarusa	Baugo Cr., St.Joseph River						Plant is closed.
Lever Brothers Hammond	Wolf Lake	7 (BOD, Oil,S)		A B C D E F G 12-68	A B C D E F G 1-69	1 Yes	Complies with water quality criteria at control point on Wolf Lake, but additional work is needed to improve conditions in Wolf Lake Channel. Bio tower not started yet. Color and solids are excessive at times.
M&T Chemical Company East Chicago	Indiana Harbor Canal	7 (N, BOD,S, TO)		A B C D E F G 12-68	A B C D E F G - 1968	1 Yes	Connected to East Chicago Sanitary District sewerage system. Adequacy is questionable--backups cause overflow to canal. M&T installed facilities to reduce deposits in sewer and recover tin. Facilities judged as adequate by State.
Union Carbide Corp. Chemical Division Whiting	Lake Michigan Indiana Harbor Canal	7 (BOD, Oil, S, TO), 8		A B C D E F G 12-68	A B C D E F G - 1968	1 Yes	Connected to East Chicago Sanitary District in 12-68. Also connected to Whiting sewers. State rated treatment adequate. Periodic high values reported on BOD will require additional in-plant controls. Repair program in effect to improve effluent.

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CB) Construction

STATUS OF COMPLIANCE
(+) Ahead of schedule
(•) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL STEPS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor.
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facil
(16) Reduction of All Cont Constituents
(17) Advanced Waste Treatm

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

June 26, 1972

ILDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
INDIANA INDUSTRIES (Continued)							
U.S. Steel Corp. Gary Works Gary	Grand Calumet River Lake Michigan	7 (Fe, S,Oil)		A B C D E F G 12-69	A B C D E F G 00	1 Yes	Indiana Stream Pollution Control Board study March-April 1970 showed treatment not adequate. Hearing held 5-26-70. Company ordered to provide adequate treatment by 12-31-72. Tin mill and sheet mill wastes directed to Cold Reduction Mill treatment plant 6-69. Coking wastes directed to Gary SD and used to quench coke. All coking waste work completed and in operation 12-31-69. Waste water from hot strip mill scale pits diverted to strip mill filtration plant (3-70). State schedule for adequate treatment "A" 10-1-70, "B" 2-1-71, "D" 7-1-71, "E" 8-1-71, "F" 9-1-71, "G" 12-31-72. U. S. Attorney filed civil action under the Refuse Act on Feburary 19, 1971. EPA is providing technical assistance to the Justice Department on this case.
U.S. Steel-Gary Tube Works Gary	Grand Calumet River Lake Michigan	8		A B 12-66 C D 6-67 E F G 12-68	A B C D E F G - 1968	1 Yes	U. S. Attorney filed a civil action under the Refuse Act. on February 19, 1971. EPA is providing technical assistance to the Justice Department on this case.
Youngstown Sheet & Tube (Central Treatment Plant & Blast Furnace,etc.) East Chicago	Indiana Harbor Canal & Lake Michigan	7 (CN, Oil,S)		A B 12-66 C D 6-67 E F G 12-69	A B C D E F G 3-70	1 Yes	

(AS) Revised Schedule (Over 1 year) (*) Unilateral Extension Given by State

REMEDIAL NEEDS (1) Sample &/or Report (2) Disinfection (3) Secondary Treatment or Equivalent (4) Phosphorus or Nutrient Removal (5) New or Improved Trt. (6) Plant Expansion (7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Dem) Oxygen Demand, (Pe) Phenol, (S) Solids, (Uo) Unsavory Odor, [illegible] Combined Sewers (10) Storm Sewer Treatment (13) Adequate Treatment (14) Improve Operation (16) Reduction of [illegible] (17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

ILDO

June 26, 1972

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	CHANGES AND/OR REASONS FOR DELAY
INDIANA INDUSTRIES (Continued)							
Youngstown Sheet and Tube (Terminal Lagoon) East Chicago	Indiana Harbor Canal	7 (Oil, S)		A B 12-66 C D 6-67 E F G 6-69	A B C D E F G 12-70	1 Yes	
Weatherhead Corp. Angola	Turkey Creek Trib. to St. Joseph River	7 (CN, Oil, M)		A B C D E F G 12-68	A B C D E F G 1968	1 Yes	Facilities consist of cyanide destruction and isolation processes. Results judged inadequate by State. Facilities are under construction for additional oil and solids removal.
Penn-New York-Central Trans. Corp. Elkhart	Honey Creek, St.Joseph River	7 (BOD, Oil, S)		A B C D E F G 6-1-69	A B C D E 9-23-70 F 11-70 G =	1 Yes	Construction of oil separation facilities completed in first quarter of 1971. All effluent now goes to City of Elkhart sewer system. Oil separator in operation.
Phillips Drill Co. Michigan City	Trail Creek	7 (Oil)		A B C D E F G 12-68	A B C D E F G = 1968	1 Yes	

KEY: CONSTRUCTION PHASE
(A) Preliminary Plans
(B) Final Plans
(C) Financing
(D) Construction

STATUS OF COMPLIANCE
(1) On or Ahead of Schedule
(2) On Schedule
(3) Behind Schedule (Less than 1 year)
(3B) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

ILDO

August 8, 1972

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF CONFERENCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
INDIANA INDUSTRIES (Continued)							
Steiner Tissue Div. Georgia Pacific Corp. Gary	Grand Calumet River	8		A B C D E F G 12-68	A B C D E F G = 9-69	1 Yes	Connected to Gary Sanitary District. State rates treatment adequate.
Union Carbide Corp. Linde Air Division East Chicago	Indiana Harbor Canal					1 Yes	Settling ponds and oil separation. State rates waste control inadequate. Additional treatment for removal of chromium requested by State will be completed by late fall, 1972. State notes better control on oil and pond operations is needed.
Middlebury Cooperative Creamery, Inc. Middlebury	Little Elkhart River	7 (BOD, S)		3, 7 A B C D E F G 12-31-69	3, 7 A = B = C = D = E = F = G = 1971	/ 1 Yes	Hearing held and stipulation agreed to with completion date of 12-1-71. Facilities have been completed. Facilities considered temporary when completed. Connection to municipal sewer system completed 1971. State rates treatment adequate.
Mobil Oil Company East Chicago	Lake George Branch Indiana Harbor Canal	7 (BOD, N, S)		A B 12-66 C D 6-67 E F G 12-68	A B C D E F G = 2-69	1 Yes	

KEY: CONSTRUCTION PHASE
[illegible] Plans
(C) Final Plans
(E) Financing
(G) Construction

STATUS OF COMPLIANCE
(+) [illegible] Schedule
(*) [illegible]
(u) Behind Schedule (Less than 1 year)
(U) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample After Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (Cn) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, (O) Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operations
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

June 26, 1972

LAKE MICHIGAN

ILDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
INDIANA INDUSTRIES (Continued)							
New Paris Creamery, Inc. New Paris	Turkey Creek St.Joseph River	7 (BOD, S)		A B C D E F G 12-68	A B C D E F G = 1968	1 Yes	
Penn-Electric Switch Company Goshen	Rock Run, St.Joseph River	7 (CN, M)		A B C D E F G 12-69	A B C D E F G = 2-69	1 Yes	

KEY: CONSTRUCTION SCHEDULE
(A) Preliminary Plans
(B) Final Plans
(C) Financing
(D) Construction

STATUS OF SCHEDULE
(+) Ahead of Schedule
(o) On Schedule
(-) Behind Schedule
(Less than 1 year)
(30) Revised Schedule
(Over 1 year)
(*) Unilateral Extension
Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment
or Equivalent
(4) Phosphorus or
Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or
Neutralization of:
Acid, (Cl) Chloride,
(Cu) Copper, (CN) Cyanide,
(Fe) Iron, (M) Metals,
(N) Nitrogen, Oil,
(OD) Oxygen Demand,
(Ph) Phenol, (S) Solids,
(TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of
Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical
Constituents
(17) Advanced Waste Treatment

MICHIGAN DISCHARGERS

8-3-72
DATE OF INFORMATION
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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

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LAKE MICHIGAN

MUNICIPALITIES

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
ALBION	Kalamazoo R	4	1.75	A B 6/1/69 C 7/1/69 D 9/1/70 E 5/1/71 F 6/1/71* G 12/1/72	A= B= C 9/70 D 6/71 E 00 F 00 G	1 Yes 2 Yes	Stipulation 5/16/69 *City declared in default 3/16/72; Show Cause Hearing with EPA participation 5/72. Final Order for phosphorus removal only adopted 6/15/72 requires F - 9/1/72, G - 12/1/72
ALLEGAN	Kalamazoo R	4	0.5	A 6/16/69 B 7/1/70 C 8/1/70 D 1/1/71* E 9/1/71 F 10/1/71* G 12/1/72	A= B= C= D 10/1/71 E 0 F 0 G	1 Yes 2 Yes	*City declared in default by WRC 6/71. FOD No. 1518 adopted with extended interim dates. Declared in default 3/72. Show Cause Hearing with EPA participation 4/72. City ready to procede if grants available. Hearing recessed for further consideration. State extension: D - 10/71, F - 3/72.
ALPINE TOWNSHIP	York & Mill Creek Grand R.	4		A B C D E F G 7/1/69	A B C D E F G 7/69		Connected to Grand Rapids system.

SYMBOL FOR DETAILED CONSTRUCTION SCHEDULE.
A Retain Engineers.
B Submit preliminary engineering report.
C Start plans and specifications.
D Submit plans and specifications.
E Arrang financing.
F Start construction.
G Complete construction and full operation.

KEY: (Construction Phase)
(PE) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, , (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor.
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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8-3-72
DATE OF INFORMATION
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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

MUNICIPALITIES

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
ANDREWS UNIVERSITY (Berrien Springs)	St. Joseph R.	4	0.07	A 4/20/69 B 6/1/70 C 7/1/70 D 1/1/71 E 5/1/71 F 6/1/71 G 12/1/72	A= B= C= D= E= F 7/71 G	1 Yes 2 Yes	Under Construction. Stipulation 3/20/69
BATTLE CREEK	Kalamazoo R.	4	0.26	A B 9/15/70 C D 3/1/71* E F 6/1/71* G 12/72	A= B= C= D 3/72 E F 00 G	1 Yes 2 Yes	Stipulation 9/18/70 Final plans delayed due to difficulties with grain from cereal mills. City declared in default by MWRC 3/16/72. Show Cause Hearing with EPA participation 5/72. *Final Order for phosphorus removal adopted 6/15/72, D - 8/1/72, F - 9/1/72, G - 12/1/72.
BENTON HARBOR AND ST. JOSEPH (joint treatment)	St. Joseph R.	4	0.07	A B 6/1/69 C 7/1/69 D 9/1/70 E 5/1/71 F 6/1/71 G 12/1/72	A= B 6/69 C= D 12/70 E= F 6/71 G	1 Yes	Under Construction, nearing completion.

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(Fi) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(B) Behind Schedule (Less than 1 year)
(BB) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, , (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor.
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

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6/23/72
DATE OF SUBMISSION
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3 of 30

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

MUNICIPALITIES

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE NON-CONST. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
BENTON TOWNSHIP	Paw Paw R.	12		A 4/1/70	A=		Connected to Benton Harbor
				B 9/15/70	B=		
				C	C=		
				D	D=		
				E	E=		
				F	F=		
				G 12/1/72	G=		
BERRIEN SPRINGS	St. Joseph R	4	0.49	A 4/20/69	A=	1 Yes	Under Construction 7/71
				B 12/1/69	B= 12/69	2 Yes	Nutrient removal and improved treatment combined into one project.
				C 1/1/70	C=		
				D 12/1/70	D= 12/70		
				E 5/1/71	E=		
				F 6/1/71	F 7/71		
				G 12/1/72	G		
		5		D 12/1/70	D=		
				E 3/1/71	E=		
				F 4/1/71	F 7/71		
				G 6/1/72	G		
BEULAH	Crystal L. (Betsie R.)	4,5		A	A=	1 Yes	Completed
				B	B=	2 Yes	
				C	C=		
				D	D 10/69		
				E	E=		
				F	F 5/70		
				G 12/1/72	G+ 2/72		

KEY: CONSTRUCTION PHASE
(PL) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CB) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(O) Behind Schedule (Less than 1 year)
(OO) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Repor.
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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8-3-72
DATE OF INFORMATION
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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

MUNICIPALITIES

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
BIG RAPIDS	Muskegon R.	4		A 8/28/69	A=	1 Yes	Show Cause Hearing with EPA participation 4/72. Expect P removal 11/72, plans 8/72. Hearing recessed to 8/72
				B 4/1/70	B=	2 Yes	
				C 5/1/70	C=		
				D 12/1/70	D 00		
				E 5/1/71	E 00		
				F 6/1/71	F 00		
				G 12/1/72	G		
BOYNE CITY	L. Charlevoix Pine R.	4	0.022	A 4/20/69	A=	1 Yes	Contracts Awarded. P removal; under construction, expect complete 11/72, 100% city financing
				B 12/1/69	B= 12/69	2 Yes	
				C 1/1/70	C=		
				D 9/1/70	D 12/71		
				E 4/1/71	E 6/72		
				F 6/1/71	F=		
				G 12/1/72	G		
BRONSON	Swan Creek St. Joseph R	4	0.04	A 6/16/69	A=	1 Yes	City has requested further extension for plan submittal (expected 7/72). Action tabled (5/72) by MWRC until 9/72.
				B 3/1/70	B=	2 Yes	
				C 4/1/70	C=		
				D 9/1/70	D 00		
				E 5/1/71	E 00		
				F 6/1/71	F 00		
				G 12/1/72	G		

KEY. CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(•) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Int.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

8-3-72
DATE OF INFORMATION
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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

MUNICIPALITIES

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
BUCHANAN	St. Joseph R	4	1.0	A 3/23/70	A=	1 Yes	Under Construction - 95% complete, expect CO 8/72
				B 4/1/70	B=	2 Yes	
				C 5/1/70	C=		
				D 12/1/70	D=		
				E 5/1/71	E+ 4/71		
				F 6/1/71	F+ 4/71		
				G 12/1/72	G		
		5		D 12/1/70	D=		
				E 3/1/71	E 4/71		
				F 4/1/71	F 4/71		
				G 6/1/72	G 0		
CADILLAC	Clam R. Muskegon R.	4	0.85	A 6/16/69	A=	1 Yes	Show Cause Hearing with EPA participation 6/15/72. Hearing recessed to July MWRC meeting at which it was reported that plans for interim phosphorus removal were submitted and that construction was expected to start within 90 days after approval.
				B 2/1/70	B=	2 Yes	
				C 3/1/70	C=		
				D 9/1/70	D 1/72		
				E 5/1/71	E 00		
				F 6/1/71	F 00		
				G 12/1/72	G		
CHARLEVOIX	Pine R.	4	1.28	A 3/14/69	A=	1 Yes	Under Construction - nearing completion.
				B 6/1/69	B 6/69	2 Yes	
				C 7/1/69	C=		
				D 9/1/70	D 9/70		
				E 5/1/71	E=		
				F 6/1/71	F 6/71		
				G 12/1/72	G		

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor.
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

MUNICIPALITIES

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
CHARLOTTE	Battle Creek R.	4	0.79	A 2/26/70 B 5/1/70 C 6/1/70 D 4/1/71 E 5/1/71 F 6/1/71 G 12/1/72	A= B= C= D 00 E 00 F 00 G	1 Yes 2 Yes	Plans and specifications (D) in preparation for interim P removal. Rate study for local financing (E) underway. MWRC staff to get details 6/72
CHIKAMING TOWNSHIP (Sawyer, Lakeside, Union Pier)	Galien R.	4	0.58	A 4/28/68 B 6/1/68 C 7/1/68 D 10/1/70 E 11/30/70 F 12/31/70 G 12/31/71	A= B= C= D 00 E 00 F 00 G 0	1 Yes 2 Yes	See City of New Buffalo
COLDWATER	Coldwater R. St. Joseph R.	4	1.4	A 9/1/69 B 3/1/70 C 4/1/70 D 1/1/71 E 2/1/71 F 3/1/71 G 12/1/72	A= B 12/69 C= D 1/71 E= F 3/71 G	1 Yes 2 Yes	Under Construction, near completion.

KEY: CONSTRUCTION PHASE
(PI) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

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DATE OF INFORMATION
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MUNICIPALITIES

LAKE MICHIGAN

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
COLDWATER STATE HOME	Mudd Cr.	4		A	A=	1 Yes	Completed - connected to City of Coldwater
AND TRAINING SCHOOL	St. Joseph			B	B=	2 Yes	
				C	C=		
				D 3/1/71	D=		
				E 11/1/71	E=		
				F 12/1/71	F=		
				G 12/1/72	G		
CONSTANTINE	St. Joseph	4	0.55	A 9/7/69	A=	1 Yes	Under construction, near completion.
				B 12/1/69	B+ 9/69	2 Yes	
				C 1/1/70	C=		
				D 12/1/70	D=		
				E 5/1/71	E=		
				F 6/1/71	F 8/71		
				G 12/1/72	G		
		5		D 12/1/70	D=		
				E 3/1/71	E=		
				F 4/1/71	F 8/71		
				G 6/1/72	G		
DELHI TOWNSHIP	Grand R.	4		A 5/23/69	A=	1 Yes	Show Cause Hearing with EPA participation 6/15/72. Hearing recessed for 30 days to permit review of alternatives.
(Ingham County)				B 3/1/70	B=	2 Yes	
				C 4/1/70	C=		
				D 1/1/71	D 00		
				E 11/1/71	E 0		
				F 12/1/71	F 0		
				G 12/1/72	G		

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, , (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

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MUNICIPALITIES

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
DELTA TOWNSHIP	Grand R.	4		A B 6/1/69 C 7/1/69 D 9/1/71* E 11/1/71 F 12/1/71* G 12/1/72	A= B= 6/69 C= D 9/70 E= F 6/71 G	1 Yes 2 Yes	Under Construction *State changed D to 9/70 and F to 6/71.
DEWITT TOWNSHIP	Looking Glass R. Grand R.	4		A B C D E 3/1/70 F 4/1/70 G 9/1/71	A= B= C= D= E= F= G=	1 Yes 2 Yes	Completed
DOWAGIAC	Dowagiac Cr St. Joseph	4		A 7/24/69 B 1/1/70 C 2/1/70 D 9/1/70 E 5/1/71 F 6/1/71* G 12/1/72	A- E 1/70 C= D 9/70 E= F 00 G	1 Yes 2 Yes	Stipulation 6/24/69. City declared in default by MWRC 9/71; Final Order No. 1565 adopted 10/21/71. *New schedule: F - 8/1/72, G (phosphorus removal) - 12/1/72

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(B) Behind Schedule (Less than 1 year)
(BB) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, , (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor.
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

MUNICIPALITIES

LAKE MICHIGAN

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
EAST JORDAN	L. Charlevoix Pine R.	4		A 7/24/69 B 12/1/69 C 1/1/70 D 9/1/70 E 5/1/71 F 6/1/71 G 12/1/72	A= B 12/69 C= D 9/70 E= F 6/71 G	1 Yes 2 Yes	Under construction, near completion.
EAST LANSING	Red Cedar R. Grand R.	4	0.682	A 9/5/69 B 8/1/70 C 9/1/70 D 8/1/71 E 11/1/71 F 12/1/71 G 12/1/72	A= B 2/71 C= D 3/72 E= F 4/72 G 6/72	1 Yes 2 Yes	Construction completed - adequacy not yet completed as of 6/72
		9		--			State schedule: D - 2/1/73, E - 4/1/73, F - 5/1/73, G - 12/31/7
EATON RAPIDS	Grand R.	4		A 5/21/69 B 3/1/70* C 4/1/70 D 3/1/71* E 11/1/71 F 12/1/71* G 12/1/72*	A= B* 10/71 C= D 6/72 E 0 F 0 G	1 Yes 2 Yes	MWRC Final Order #1255 - 4/21/69. State referred matter to State Attorney General. Judgement entered Eaton County Circuit Court 8/12/71. *PP 9/1/71; FP 6/1/72; F 8/1/72; G 3/31/74. Final Plans (D) submitted and approved as of 6/72.

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(FI) Financing
(CO) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

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MUNICIPALITIES

[illegible]	Receiving Waters	Remedial Items	Estimated Total Cost (Million $)	Required Construction Schedule	Status of Construction	Status of Compliance [illegible]		Comments and/or Reasons for Delay
ESCANABA	Portage Cr.	4	2.25	A 3/14/69	A=	1	Yes	Under Construction
				B 6/1/69	B 10/70	2	Yes	
				C 7/1/69	C=			
				D 3/1/71	D 11/70			
				E 11/1/71	E=			
				F 12/1/71	F 6/71			
				G 12/1/72	G			
FREMONT	Darling Cr. Muskegon R.	4	0.04	A 4/20/69	A=	1	Yes	Under Construction
				B 5/1/70	B=	2	Yes	
				C 6/1/70	C=			
				D 9/1/70	D 4/72			
				E 5/1/71	E=			
				F 6/1/71	F =			
				G 12/1/72	G			

KEY [illegible]

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(U) Behind Schedule (Less than 1 year)
(UU) Behind Schedule (More 1 year)
(*) Unilateral Extension Given by State

REMEDIAL ITEMS
(1) [illegible] Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Taste Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Water Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

MUNICIPALITIES

[illegible] & Location	Receiving Waters	Remedial Needs	Estimated Total Cost (Millions $)	[illegible] Schedule	Status of [illegible]	Status of [illegible]	Comments [illegible]
GLADSTONE	L. Michigan	4	0.40	A 4/23/69	A=	1 Yes	Under construction
				B 3/1/70	B=	2 Yes	
				C 4/1/70	C=		
				D 12/1/70	D 8/71		
				E 5/1/71	E=		
				F 6/1/71	F=		
				G 12/1/72	G		
		5		D 12/1/70	D 8/71		
				E 4/1/71	E 00		
				F 5/1/71	F 00		
				G 6/1/72	G 0		
GRAND HAVEN	Grand R.	4		A 5/23/69	A=	1 Yes	Joint project with Spring Lake. Under Construction.
				B 9/1/69	B=	2 Yes	*State extension: D-12/71, F - 2/72.
				C 10/1/69	C=		
				D 9/1/70*	D 4/72		
				E 5/1/71	E=		
				F 6/1/71*	F 5/72		
				G 12/1/72	G		
GRAND LEDGE	Grand R.	4	0.259	A 1/11/70	A=	1 Yes	*WRC Final Order No. 1566 (10/21-22/71: "B" 11-15-71, "D" 1-15-72, "F" 3-1-72, "G" 12-1-72.
				B 11/1/70*	B 11/71	2 Yes	City (5-72) requested further extension of "D" to 9-1-72. Action tabled 6-72 by MWRC until 7-72.
				C 12/1/70	C 00		
				D 6/1/71*	D 00		
				E 8/1/71	E 0		
				F 9/1/71*	F 0		
				G 12/1/72	G		

KEY: IMPLEMENTATION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(F) Financing
(C) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Ammonia, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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DATE OF INFORMATION
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R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

MUNICIPALITIES

NAME, SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
GRAND RAPIDS	Grand R	4	14.5	A B 6-1-69 C 7-1-69 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D= E= F+ 12-70 G	1 Yes 2 Yes	Under construction.
GRANDVILLE	Grand R	4	0.66	A 9-1-69 B 5-15-70* C 6-15-70 D 9-1-70* E 5-1-71 F 6-1-71* G 12-1-72	A= B 8/70 C= D 5/71 E= F= G	1 Yes 2 Yes	Under Construction. *State schedule: B - 8/70, D - 3/71, F - 8/71.
GREENVILLE	Flat R Green R	4		A 5-23-69 B 11-1-69* C 12-1-69 D 12-1-70* E 5-1-71 F 6-1-71 G 12-1-72	A= B 6/69 C= D+ 9/70 E= F= 6-71 G	1 Yes 2 Yes	Under construction, near completion. *State schedule: B - 6/69, D - 9/70.

NOTE: CONSTRUCTION PHASE
(A) Preliminary Plans
(B) Final Plans
(C) Financing
(D) [illegible]

STATUS OF COMPLIANCE
(=) [illegible] schedule
(+) [illegible] schedule
(-) Behind schedule
(less than 1 year)
(AB) Behind Schedule
(over 1 year)
(*) Unilateral Extension
Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment
or Equivalent
(4) Phosphorus or
Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or
Neutralization of
Acid, (Cl) Chloride,
(Cu) Copper, (CN) Cyanide,
(Fe) Iron, (M) Metals,
(N) Nitrogen, Oil,
(NOD) Oxygen Demand,
(Ph) Phenol, (S) Solids,
(8) Connect to Municipal System
(9) Separation or Control of
Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Fact
(16) Reduction of All Crit.
Constituents
(17) Advanced Waste Treatm

MUNICIPALITIES

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

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LAKE MICHIGAN

MUNICIPALITY NAME & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLETED CONSTRUCTION	STATUS OF CONTINUING ADD'L REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
HARBOR POINTE ASSOC.	L. Mich.	4, 5		A 7-24-69 B 12-1-69 C 1-1-70 D 12-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D= E= F= G	1 Yes 2 Yes	Under Construction (Treatment by City of Harbor Springs), nearing completion.
HARBOR SPRINGS	L. Mich.	4, 5	0.90	A 5-23-69 B 9-1-69 C 10-1-69 D 12-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D 12/70 E= F= 6/71 G	1 Yes 2 Yes	Under Construction, near completion.
HARTFORD	PawPaw R.	4	0.90	A 4-24-69 B 9-1-69 C 10-1-69 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D= E 00 F 00 G	1 Yes 2 Yes	WRC Final Order adopted 3/24/69 (#1249) Will provide interim facilities with city funds.
HASTINGS	Thornapple R., Grand R.	4		A 4-20-69 B 6-1-69 C 7-1-69 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B 6/69 C= D 9/70 E= F= 12/70 G	1 Yes 2 Yes	Under Construction, near completion.

KEY: CONSTRUCTION PHASE
(PP) Preliminary Plans
(FP) Final Plans
(F) Financing
(C) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(-) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
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(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
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(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

R E G I O N V

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

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DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES	(CON'T)						
HILLSDALE	St. Joseph R	4	0.08	A 4-20-69	A=	1 Yes	City indicated 6-72 need for grant monies, MWRC staff to ask
				B 9-1-69	B=	2 Yes	for costs on interim phosphorus removal.
				C 10-1-69	C 5-72		*State schedule: D - 2/72, F - 6/72.
				D 9-1-70	*D=		
				E 5-1-71	E 00		
				F 6-1-71	*F 00		
				G 12-1-72	G		
HOLLAND	L.Macatawa	4	2.0	A 4-20-69	A=	1 Yes	Under construction, near completion.
				B 6-1-69	*B= 9/69	2 Yes	*State schedule: D - 9/69.
				C 7-1-69	C=		
				D 9-1-70	D= 9/70		
				E 5-1-71	E=		
				F 6-1-71	F= 6/71		
				G 12-1-72	G		
HUDSONVILLE	Buttermilk Creek Grand R	4		A	A=		Connected to Grandville
				B	B=		
				C	C=		
				D	D=		
				E	E=		
				F	F=		
				G 5-1-70	G= 1970		

KEY: [illegible]
(PP) Preliminary Plans
(FP) Final Plans
(F) Financing
[illegible]

STATUS OF COMPLIANCE
(AS) Ahead of Schedule
(O) On Schedule
(B) Behind Schedule
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension [illegible] State

REMEDIAL NEEDS
(1) [illegible] Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, , (OD) Oxygen Demand, (Ph) Phenol, (S) Solids,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Pract
(16) Reduction of All Crit. Constituents
(17) Advanced Waste Treatm

R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

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[illegible] SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES	(CON'T.)						
IONIA	Grand R.	4	1.3	A 6-16-69 B 4-1-70 C 5-1-70 D 12-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D 3-72 E 00 F 00 G	1 Yes 2 Yes	MWRC 6-72 scheduled a hearing with City and EPA to discuss interim phosphorus removal.
IRON MOUNTAIN-KINGSFORD	Menominee R	4	2.75	A 10-22-69 B 3-1-70 C 4-1-70 D 9-1-70 E 4-1-71 F 5-1-71 G 12-1-72	A= B 7-70 C= D 12-71 E 3-72 F 00 G	1 Yes 2 Yes	MWRC 3-72 scheduled a show cause hearing with EPA participation (probably 8-72 at Marquette) State schedule: D - 3/71, F - 6/71.
		5		D 3-1-71 E 3-1-71 F 4-1-71 G 6-1-72	D 12-71 E 3-72 F 00 G 0		Both nutrient removal and improved treatment combined into one project.

KEY [illegible]
(A) Preliminary Plans
(B) Final Plans
(C) [illegible]

STATUS [illegible]
(=) [illegible]
(0) Behind Schedule
(00) Behind Schedule [illegible]
(*) [illegible]

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Int.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improved Operation
(15) Evaluate Present Fac.
(16) Reduction of All [illegible] Constituents
(17) Advanced Waste Treatment

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

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[illegible]
6-20-72
[illegible]
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[illegible]	[illegible]	[illegible]	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE [illegible] REQUIREMENTS	[illegible] FOR DELAY
MICHIGAN MUNICIPALITIES	(CONT.)						
IRON RIVER	Iron R. Brule R. Menominee R.	4	0.05	A 8-22-69 B 4-1-70 C 5-1-70 D 1-1-71 E 5-1-71 F 6-1-71 G 12-1-72	A B= 2/72 C= D 00 E 00 F 00 G	1 Yes 2 Yes	Plans delayed by controversy on area wide plant. Show cause conference held in April 1971 as to why Iron River, Gaastra, Caspian, and Stambaugh should not be declared in default of terms of respective stipulations. Conference recessed to May meeting to allow investigation of possibility of obtaining a Federal Grant for a study on feasibility of all possible approaches. Report on engineering to settle dispute about prospective location of four-town facility approved 2-25-72.
JACKSON	Grand R.	4	4.3	A B C D E F G 12-1-72	A= B= C= D 11-70 E= F 12-71 G	1 Yes 2 Yes	Under Construction
KALAMAZOO	Kalamazoo R.	4	0.50	A 3-14-69 B 6-1-71 C 7-1-71 D 1-1-72 E 2-1-72 F 3-1-72 G 12-1-72	A= B= C= D= E= F= G+ 11-71	1 Yes 2 Yes	Completed

[illegible]

R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

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DATE OF [illegible]
8/3/72
PREPARED BY
MIDO 17 g

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE [illegible] REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CONT.)							
KENTWOOD (FORMERLY PARIS TWP.)	Plaster Cr. Grand R.	4			G= 1970		Connected to Grand Rapids.
LANSING	Grand R.	4	0.66	A 9-1-69	A=	1 Yes	Interim facilities will meet 12/72 date.
				B 4-15-70	B=	2 Yes	State schedule: F - 7/72.
				C 5-15-70	C=		
				D 3-1-71	D 00		
				E 11-1-71	E 0		
				F 12-1-71	F 0 /		
				G 12-1-72	G		
		9		--			State schedule: B - 7/1/72, D - 12/1/74, E - 6/1/74, F - 3/1/75, G - 12/31/76.
LEONI TWP.	Grand R.	4		A	A=	1 Yes	Under construction.
				B	B=	2 Yes	
				C	C=		
				D	D=		
				E	E=		
				F	F=		
				G 12-1-72	G		

KEY: [illegible]
(A) [illegible] (B) Engineering Plans (C) Final Plans (D) Financing [illegible]

STATUS OF COMPLIANCE:
(+) Ahead of Schedule (0) On Schedule (-) Behind Schedule [illegible] (00) Behind Schedule (Over 1 year) (*) Postponed Extension Given by State

REMEDIAL NEEDS:
(1) Sample Flow Report (2) Disinfection (3) Secondary Treatment or Equivalent (4) Phosphorus or Nutrient Removal (5) New or Improved Int. (6) Plant Expansion (7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (Cn) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (8) Connect to Municipal System (9) Separation or Control of Combined Sewers (10) Storm Sewer Treatment (11) Exclude Clear Water (12) Sewers (13) Adequate Treatment (14) Improve Operation (15) Evaluate Present (16) Reduction of All Constituents (17) Advanced Waste Tr

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

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DATE OF INFORMATION
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Discharger, Source & Location	Receiving Waters	Remedial Needs	Estimated Total Cost (Millions $)	Required Construction Schedule	Status of Construction	Status of Compliance Addl. Requirements	Comments and/or Reason for Delay
MICHIGAN MUNICIPALITIES (CONT.)							
LOWELL	Grand R.	4	0.033	A 2-20-70 B 9-1-70 C 10-1-70 D 5-1-71 E 11-1-71 F 12-1-71 G 12-1-72	A= B= C= D 00 E 0 F 0 G	1 Yes 2 Yes	WRC Final Order Jan. 20, 1970. As of 3-72 City still undecided as to method, requests indefinite extension for "D." City declared in default, referred to Attorney General for enforcement action.
LUDINGTON	Pere Marquette R.	4	1.78	A B 10-1-70 C D 3-1-71 E 11-1-71 F 12-1-71 G 12-1-72	A= B= C= D- 3-72 E- F= G	1 Yes 2 Yes	WRC Final Order No. 1385. Under construction.
MANISTEE	Manistee R.	4	2.1	A 3-14-69 B 6-1-69 C 7-1-69 D 9-1-70* E 5-1-71 F 6-1-71* G 12-1-72	A= B= C= D= 4/72 E 00 F 00	1 Yes 2 Yes	Preliminary report proposed to dispose of effluent by spray irrigation. *Final Order No. 1504 (5-71): "D" 8-71, "F" 3-72, "G" 12-72.

[illegible]

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

[illegible]
8/3/72
[illegible]
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[illegible]	RECEIVING WATERS	REMEDIAL NEED	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF CONSTRUCTION	STATUS OF EFFLUENT REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CONT.)							
MANISTIQUE	Manistique R	4	2.59	A	A	1 Yes	Hearing held 8-20-69.
				B 7-1-70	B=	2 Yes	WRC Final Order No. 1372.
				C 8-1-70	C=		
				D 7-1-71	D 0		
				E 8-1-71	E 0		
				F 10-1-71	F 0		
				G 12-1-72	G		
MARSHALL	Kalamazoo R	4		A 4-20-69	A=	1 Yes	Stipulation deadlines not met. Engineering report submitted
				B 6-1-69	B 7-23-71	2 Yes	6-69 did not include secondary treatment.
				C 7-1-69	C=		*Final Order No. 1459, Jan. 1971: D - 1/1/72, F - 5/1/72,
				D 9-1-70*	D 1-72		G - 12/1/72, and additional treatment by 6/1/73.
				E 5-1-71	E 00		
				F 6-1-71*	F 00		
				G 12-1-72*	G		
MASON	Sycamore Cr Grand R.	4	0.5	A 11-16-69	A=	1 Yes	Stipulation 10-16-69
				B 3-1-70	B=	2 Yes	Plans submitted for Tertiary Treatment and Phosphorus Removal.
				C 4-1-70	C=		City declared in default of stipulation by MWRC at 3-72 meeting.
				D 12-1-70	D 3-72		
				E 7-1-71	E 0		
				F 8-1-71	F 0		
				G 12-1-72	G		

KEY: [illegible]

(4B) Revised Schedule (Less 1 year)
(*) Unofficial Extension [illegible] by State
(Not more 1 year)

REMEDIAL NEEDS
(1) Sewage Flow Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (Oxd) Oxygen Demand, (Ph) Phenol, (S) Solids, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Perf
(16) Reduction of All Crit. Constituents
(17) Advanced Waste Treatment

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R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

[illegible] SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CONT.)							
MENOMINEE	Menominee R.	4	2.78	A 3-14-69	A=	1 Yes	*Under Final Order dates changed to "D" 8-1-71, "E" 9-1-71, "F" 10-1-71.
				B 6-1-69	B=	2 Yes	Under construction.
				C 7-1-69	C=		
				D 9-1-70*	D= 5/72		
				E 5-1-71*	E		
				F 6-1-71*	F= 5/72		
				G 12-1-72	G		
		5		D 12-1-70	D 6-72		
				E 5-1-71	E 00		
				F 6-1-71	F 00		
				G 12-1-72	G		
MICHIGAN REFORMATORY (IONIA)	Grand R.	4		A	A=	1 Yes	Plan to join City of Ionia's system. Negotiations with reformatory have delayed sewer project at Ionia. Plans essentially complete, will connect when City of Ionia completes its project.
				B	B=	2 Yes	
				C	C=		
				D 3-1-71	D 00		
				E 11-1-71	E 0		
				F 12-1-71	F 0		
				G 12-1-72	G		

KEY [illegible]

(dh) Behind Schedule (Over 1 year)

REMEDIAL NEEDS
(1) [illegible] Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Fac
(16) Reduction of All Crit Conditions
(17) Advanced Waste Treatm

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

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DATE OF INFORMATION 8/3/72
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[illegible] SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CONT.)							
MUSKEGON	Muskegon R.	4	21.9	A 4-20-69 B 6-1-69 C 7-1-69 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D= E= F=5/71 G	1 Yes 2 Yes	Under construction (Muskegon County Project).
MUSKEGON HEIGHTS	Muskegon R.	4	0.08	A 9-1-69 B 5-1-70 C 6-1-70 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D= E= F= G	1 Yes 2 Yes	Under construction (Muskegon County Project).
NEW BUFFALO	Galien R.	4		A 4-24-69 B 2-1-70 C 3-1-70 D 10-1-70 E F 12-31-70 G 12-31-71	A= B= C= D= E 00 F 00 G 0	1 Yes 2 Yes	WRC Final Order No. 1250 not complied with City has formed the Galien River Sanitary District with Chikaming Twp. and New Buffalo Twp. New dates being established. Plans to be submitted mid-December 1971. Show Cause conference held 6/72. Plans for interim phosphorus removal submitted.

[illegible]

STATUS OF COMPLIANCE
(+) [illegible] Schedule
(0) On Schedule
(-) Behind Schedule (Less than 1 year)
(00) Behind Schedule (over 1 year)
(*) Collateral Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (cl) Chlorides, (cu) Copper, (cn) Cyanide, [illegible] Iron, (M) Metals, (N) Nitrogen, Oil, (O) Oxygen Demand, (Ph) Phenol, (S) Solids, (To) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Fac.
(16) Reduction of All Crit. Constituents
(17) Advanced Waste Treatm

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Date of [illegible]
8/3/72
Prepared by
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REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

[illegible] SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CONT.)							
NEW BUFFALO TWP. (UNION PIER AREA)	Galien R.	13		A 4-26-68 B 6-1-68 C 7-1-68 D 10-1-70 E F 12-31-70 G 12-31-71	A= B= C 00 D 00 E 00 F 00 G 0	1 Yes 2 Yes	WRC Final Order No. 1135 not complied with. They have formed the Galien River Sanitary District with Chikaming Twp. and New Buffalo. A new schedule will be submitted to the WRC shortly. Plans to be submitted 12-71 and hope to be under construction early 1972. (See New Buffalo)
NILES	St. Joseph R.	4	8.3	A 4-20-69 B 6-1-69 C 7-1-69 D 12-1-70* E 3-1-71 F 4-1-71* G 12-1-72	A= B- 9-70 C= D 4-72 E 00 F 00 G	1 Yes 2 Yes	*Schedule for "D" and "F" extended 8-1-71 and 10-1-71. WRC Final Order No. 1460, 1-22-71.
		9		--			State schedule: D - 8/71, F - 10/71, G - 6/77.
NORTH MUSKEGON	Muskegon R.	4	0.05	A B 6-1-69 C 7-1-69 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D= E= F= G	1 Yes 2 Yes	Under construction (Muskegon County Project).

KEY: Construction Schedule
[illegible] Preliminary Plans
[illegible] Final Plans
[illegible] Financing
[illegible] Construction

Status of Compliance
[illegible]
[illegible]
[illegible] Behind Schedule (less than 1 year)
(OO) Behind schedule (over 1 year)
(*) Postponed extension given by State

Remedial Needs
(1) Sample Base Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) Use of Improved Tech.
(6) Plant Operation
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chlorides, (Cu) Copper, (Cn) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improved Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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REGION V

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

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DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CONT.)							
NORWAY	Menominee R.	4	0.05	A 10-22-69 B 3-1-70 C 4-1-70 D 2-1-71 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D 9-71 E 00 F 00 G	1 Yes 2 Yes	WRC Final Order No. 1306, 9-22-69. To provide interim phosphorus removal until Federal funds are available. State schedule: D - 7/71, F - 10/71.
OTSEGO	Kalamazoo R.	4	0.14	A 7-24-69 B 6-1-70 C 7-1-70 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D 4-71 E 4-72 F 00 G	1 Yes 2 Yes	
PAW PAW	Paw Paw R.	4	0.7	A 4-24-70 B 5-1-70 C 6-1-70 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D 2-72 E 00 F 5-72 G	1 Yes 2 Yes	Under construction.

KEY: CONSTRUCTION STATUS
(PP) Preliminary Plans
(FP) Final Plans
(F) Financing
(C) Construction

STATUS OF COMPLIANCE
(a) Ahead of Schedule
(o) On Schedule
(b) Behind Schedule (less than 1 year)
(bb) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Comply Engr Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide,
(Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Faci
(16) Reduction of All Crit Constituents
(17) Advanced Waste Treatm

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	[illegible]	ESTIMATED COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CONT.)							
PETOSKEY	L. Mich.	4	2.02	A 4-20-69	A=	1 Yes	Under construction
				B 8-1-69	B=	2 Yes	
				C 9-1-69	C=		
				D 12-1-70	D=		
				E 5-1-71	E=		
				F 6-1-71	F= 6-71		
				G 12-1-72	G		
		5		D 12-1-70	D=		
				E 3-1-71	E=		
				F 4-1-71	F 6-71		
				G 6-1-72	G 0		
PLAINFIELD TWP	York & Mill Cr. Lamberton L. Grand R.	4		A	A=		Connected to Grand Rapids system.
				B	B=		
				C	C=		
				D	D=		
				E	E=		
				F	F=		
				G 7-1-69	G= 7-69		

[illegible]

R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

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DATE OF INFORMATION
4-3-72
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DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CONT.)							
PLAINWELL	Kalamazoo R.	4	0.05	A 4-24-69 B 10-1-69* C 11-1-69 D 3-1-71* E 11-1-71 F 12-1-71* G 12-1-72	A= B 11-69 C 9-70 D+ 1-71 E 0 F 0 G	1 Yes 2 Yes	WRC Final Order of Determination No. 1240, 3-24-69. *WRC Final Order No. 1581 (11-71): "B"4-72, "D" 7-72, "F" 9-72, "G" (PR) 12-72.
PORTLAND	Grand R.	4	0.516	A 5-21-69 B 4-1-70 C 5-1-70 D 12-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= 4/70 C= D= 12/70 E= F 10/71 G	1 Yes 2 Yes	Under construction.
REED CITY	Hersey R. Muskegon R.	4	0.69	A 6-16-69 B 3-1-70 C 4-1-70 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D= 10/70 E= F= 6/71 G	1 Yes 2 Yes	Under construction, near completion.

[illegible] (dk) Beyond Schedule [illegible]

REMEDIAL NEEDS
(1) [illegible]
(2) Disinfection [illegible]

(4) Phosphorus or Nutrient Removal
(5) [illegible] Improved Tmt

(7) Reduction, Removal or Neutralization of Acid, (L) Chloride, [illegible] Cyanide,

(Fe) Iron, (M) Metals, (N) Nitrogen, Oil, [illegible] Oxygen Demand, (Ph) Phenol, (S) Solids, [illegible]

(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment

(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation

(15) Evaluate Present Fact
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

DATE OF [illegible]
8-3-72
MIDO 26 of 30

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES (CON'T)							
ROCKFORD	Rouge R. Grand R.	4		A	A=		Connected to Grand Rapids.
				B	B=		
				C	C=		
				D	D=		
				E	E=		
				F	F=		
				G 7-1-69	G+ 8-70		
ST. JOHNS	Hayworth Cr. Grand R.	4		A	A=	1 Yes	Ordered to provide phosphorus removal according to schedule
				B	B 7-71	2 Yes	
				C	C		WRC Final Order #1386
				D	D		
				E	E		
				F	F		
				G 12-1-72	G		
SOUTH HAVEN	Black R.	4	0.36	A 5-23-69	A=	1 Yes	WRC Final Order #1542 (8-30-71): "D" 7-1-70,"F" 10-1-71
				B 4-1-70	B=	2 Yes	*Plans submitted 5-17-71 (consent order) FP 12-71, SC 3-1-72;
				C 5-1-70	C=		CO 12-1-73
				D 12-1-70*	D 1-72		Under construction.
				E 5-1-71	E=		
				F 6-1-71*	F=		
				G 12-1-72*	G		
SPARTA	Nash Cr. Grand R.	4		A	A=	1 Yes	Completed
				B	B=	2 Yes	
				C	C=		
				D	D=		
				E	E=		
				F	F=		
				G 12-1-72	G+ 1970		

KEY: CONSTRUCTION PHASE
(A) Preliminary Plans
(B) Final Plans
[illegible]
[illegible]

STATUS OF COMPLIANCE
[illegible]
[illegible]
(-) Behind Schedule (less than 1 year)
(-B) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) [illegible]
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) [illegible] Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Fac.
(16) Reduction of All Crit. Constituents
(17) Advanced Waste Treatment

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DATE OF INFORMATION 8-3-72
Prepared by MIDO

27 of 30

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

[illegible] SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES	(CON'T.)						
SPRINGFIELD	Kalamazoo	4			G=		Connected to Battle Creek system
SPRING LAKE	Grand R.	4	.	A 4-20-69 B 9-1-69 C 10-1-69 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D 2-72 E F 5-72 G	1 Yes 2 Yes	Will connect with Grand Haven's system WRC Final Order #1541 (8-20-71) "D" by 12-1-71, "F" by 2-1-72, "G" 12-1-72.
STATE PRISON (JACKSON)	Grand R.	4		A B C D E F G 12-72	A= B= C= D= E= F= G	1 Yes 2 Yes	Construction underway to join Jackson County interceptor
STURGIS	White Pigeon R. St.Joseph R	4	0.547	A 5-28-69 B 9-1-69 C 10-1-69 D 9-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= 11-70 C= D= 12-70 E= F= 6-71 G	1 Yes 2 Yes	Under construction

KEY [illegible]
(B) Preliminary Plans
(C) Final Plans
(D) Financing
(E) Construction [illegible]

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(-) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Granted by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improved Operation
(15) Evaluate Present Fac.
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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DATE OF INFORMATION
8-3-72
PREPARED BY
MIDO 28 of 30

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS (GIVE REASONS FOR DELAY)
MICHIGAN MUNICIPALITIES	(CON'T)						
THREE RIVERS	St. Joseph R	4	1.26	A 6-16-69 B 9-1-69 C 10-1-69 D 12-1-70 E 5-1-71 F 6-1-71 G 12-1-72	A= B= C= D= E= F 4-71 G	1 Yes 2 Yes	Under construction Both 4 & 5 combined into one project
		5		D 12-1-70 E 3-1-71 F 4-1-71 G 6-1-72	D= E= F= 4-71 G 0		
TRAVERSE CITY	Boardman R.	4,5	8.5	A 9-30-68 B 10-15-69 C 11-15-69 D 6-1-70 E 6-15-70 F 7-15-70 G 12-31-71	A= B= 8-70 C= D= 11-70 E= F= 12-70 G=	1 Yes 2 Yes	Complete.
VICKSBURG	Portage Cr. St. Joseph R	4	0.47	A 3-14-69 B 8-1-69 C 9-1-69 D 9-1-70* E 5-1-71 F 6-1-71* G 12-1-72	A= B= C= D 00 E 00 F 00 G	1 Yes 2 Yes	Final Order of Determination #1493 adopted 4-22-71 extended "D" to 7-1-71, "F" to 10-1-71.

CONSTRUCTION ENTRY
(A) Preliminary Plans
(B) Final Plans
(C) Financing
(D) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (less than 1 year)
(00) Behind Schedule (over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Sample Area Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) Use of Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (SS) Suspended Sol.
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clean Water
(12) Sewers
(13) Adequate Treatment
(14) Improved Operation
(15) Evaluate Present Fact.
(16) Reduction of All Crit. Constituents
(17) Advanced Waste Treatm

R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

91<

[illegible]
6-20-72
[illegible]
MIDO 29 of 30

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MICHIGAN MUNICIPALITIES	(CON'T)						
WALKER	Tellman Cr. Grand R.	4		G 12-31-68	G-		Connected to Grand Rapids system
WEQUETONSING	L. Michigan	4,5		A 9-1-69	A-	1 Yes	Will connect with the Harbor Springs system
				B 12-1-69	B- 12-69	2 Yes	Under construction.
				C [illegible]-1-70	C-		
				D 12-1-70	D- 12-70		
				E 5-1-71	E-		
				F 6-1-71	F- 6-71		
				G 12-1-72	G		
WHITEHALL	White R.	4	0.30	A 11-16-68	A-	1 Yes	Under construction (Muskegon County System)
				B 7-1-70	B-	2 Yes	Will join Muskegon County Plan which will provide a spray irrigation system. See City of Muskegon.
				C 8-1-70	C-		Both 4 & 5 combined into one project. Construction of interceptor to hook up with Muskegon started 5-71. However, Muskegon plant behind schedule.
				D 9-1-70	D-		
				E 5-1-71	E-		
				F 6-1-71	F- 5-71		
				G 12-1-72	G		
		5		D 3-1-71	D-		
				E 7-1-71	E-		
				F 8-1-71	F- 5-71		
				G 10-1-72	G		

[illegible]

REGION V

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

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DATE OF INFORMATION
8-3-72
PREPARED BY
MIDO 30 of 30

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN MUNICIPALITIES	(CON'T)						
WILLIAMSTON	Grand R.	4	0.608	A 9-11-69	A=	1 Yes	Under construction
				B 9-15-69	B=	2 Yes	
				C 10-15-69	C=		
				D 9-1-70	D= 9-70		
				E 5-1-71	E=		
				F 6-1-71	F= 6-71		
				G 12-1-72	G		
WYOMING	Grand R.	4	7.7	A 10-17-69	A=	1 Yes	City has decided to enlarge plant in addition to providing phosphorus removal. City consented 8-30-71 to entry of Final Order incorporating extended performance dates. Final Order #1553 adopted by WRC 9-23-71. "G" by 12-73/ Under construction.
				B 7-1-70	B=	2 Yes	
				C 8-1-70	C=		
				D 1-1-71	D 1-72		
				E 5-1-71	E=		
				F 6-1-71	F=		
				G 12-1-72	G		
ZEELAND	Black R.	4	0.137	A 5-23-69	A=	1 Yes	Under construction.
				B 4-1-70	B= 6-70	2 Yes	
				C 5-1-70	C=		
				D 12-1-70	D 7-71		
				E 11-1-71	E=		
				F 12-1-71	F=		
				G 12-1-72	G		

[illegible]

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

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[illegible]
8-3- 72
[illegible]
MIDO 1 of 2

[illegible]	RECEIVING WATERS	[illegible]	ESTIMATED TOTAL COST [illegible]	REQUIRED CONSTRUCTION SCHEDULE		STATUS OF COMPLIANCE CONSTRUCTION		STATUS OF COMPLIANCE [illegible] REQUIREMENTS	[illegible]
MICHIGAN INDUSTRIES									
AMERICAN CAN CO.	Menominee R.	5		A	3-9-70	A=		1 Yes	Stipulation 2-9-70.
MARATHON DIVISION				B	6-1-70	B=			Completed.
MENOMINEE, MICH.				C	7-1-70	C=			
				D	1-1-71	D=			
				E	5-1-71	E=			
				F	6-1-71	F=	6-71		
				G	12-1-72	G+			
MEAD CORPORATION	Escanaba R.	5		A		A=		1 Yes	OD #1161 5-68
ESCANABA DIVISION				B		B=			Company plans to expand plant. Portions of additional treatment facilities in operation; phased program will require additional wastewater treatment facilities as paper production is increased.
ESCANABA, MICH.				C		C=			
				D		D	7-70		
				E		E			
				F		F			
				G		G=	(see note)		
MORGAN MC COOL, INC.	Grand Traverse Bay	5		A	6-16-69	A=		1 Yes	Completed
TRAVERSE CITY, MICH.				B	5-1-70	B=			Tart cherry wastes disposed of via land disposal.
				C	6-1-70	C=			Apple and plum wastes accepted by City system.
				D	3-1-71	D=			
				E	5-30-71	E=			
				F	6-30-71	F=			
				G	12-1-71	G	4-72		

[illegible]

R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

94s

DATE OF [illegible]
8-3-72
PREPARED BY
MIDO 2 of 2

[illegible] SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADM'T. REQUIREMENTS	COMMENTS ABOUT REASON FOR DELAY
MICHIGAN INDUSTRIES (CON'T)							
PACKAGING CORPORATION OF AMERICA, AMERICAN BOX BOARD DIVISION, FILER CITY, MICH.	L. Michigan Manistee Lake	3		A B C D 4-1-71 E 6-1-71 F 7-1-71 G 12-1-72	A= B= C= D- E- F 2-72 G	1 Yes	Under construction, nearing completion.
TRAVERSE CITY CANNING COMPANY TRAVERSE CITY, MICH.	Boardman R.	5		A 6-16-69 B 5-1-70 C 6-1-70 D 3-1-71 E 5-30-71 F 6-30-71 G 12-1-71	A= B= C= D= E= F= G=	1 Yes	Completed Cherry wastes to land disposal. Other fruit wastes handled by municipal system.

CONSTRUCTION PHASE
(P) Preliminary Plans
(FP) Final Plans
(F) Financing
(C) Construction

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(-) Behind Schedule (Less than 1 year)
(BB) Behind Schedule (More 1 year)
(*) Additional Extension Given by State

REMEDIAL NEEDS
(1) [illegible] Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Fl) Fluoride, (Cu) Copper, (CN) Cyanide,
(Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (BOD) Oxygen Demand, (Ph) Phenol, (S) Solids, (Th) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Eliminate Present Outf'
(16) Reduction of All Critical Constituents
(17) Advanced waste treatment

WISCONSIN DISCHARGERS

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWSO

DISCHARGER & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADMIN. REQUIREMENTS	[illegible]
WISCONSIN MUNICIPALITIES							
Algoma	Ahnapee R.	3, 4		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	A B 4-1-71 C D 4-1-72 E 0 F 0 G	1 Yes 2 Yes 11 No	State order issued 12-15-70: For (4): B 3-31-71 For (11): B 6-1-71 D 8-31-71 F 3-31-72 G 12-31-72 Extension granted 12-3-71 for (4): D 3-1-72 F 5-1-72 Clear water report submitted 3-15-72. Final plans for treatment facility including phosphorus removal were approved 5-16-72
Appleton	Fox R.	1, 2, 4 6		(4)(6) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 9-72	(4)(6) A B 7-27-72 C 00 D 00 E F 00 G	1 Yes 2 Yes	Amended State orders issued 3-5-70: For (2) G 6-1-70 For (13)(4) G 9-30-72

A - Retain engineers.
B - Submit preliminary engineering report.
C - Initiate detailed engineering plans and specifications.
D - Submit detailed engineering specifications.
E - Arrange financing.
F - Initiate construction.
G - Complete construction and place in full-time operation.

[illegible] (2C) Tabled Schedule (Over 1 year) [illegible] (1) [illegible] (2) Disinfection [illegible] (4) Phosphorus or Nutrient Removal [illegible] (6) Plant Expansion (7) Reduction, Removal or Disinfection of: [illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

[illegible]
AUGUST 7, 1972
MWDO

[illegible]	[illegible]	[illegible]	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF [illegible] CONSTRUCTION	STATUS OF [illegible]	[illegible]
WISCONSIN MUNICIPALITIES CONT.							
Austin-Straubel Airport, Green Bay	Trib. Fox River	4		G 12-72	G 1970	1 Yes 2 Yes	In compliance.
Berlin	Silver Cr. Fox R.	1, 3, 4		(3)(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(3)(4) A B 10-21-71 C 00 D 0 E 0 F 0 G	1 Yes 2 Yes	Amended state order issued 1-30-70 for (3)(4)(11): G 12-31-72. Preliminary plans submitted 10-21-71. Clear water problem surveyed and partially eliminated; adequacy not determined.
Butler	Menomonee River	1, 2, 3 or 8		(8) G 12-72	(8) G partial	1 Yes 2 Yes	Connected to Milwaukee Met but must by-pass during peak dry weather flow. Milwaukee will not accept peak flows until 1974. Excess flow treated by septic tank and chlorination.
Cedarburg	Cedar Cr.	1, 2, 4		(13) D 9-70 E 10-70 F 1-71 G 11-71 (4) G 12-72	(13) D 8-4-70 E 12-71 F 9-71 G 0 (4) G 8-72	1 Yes 2 Yes	Amended state order 4B-68-051-05A issued 2-27-70: For (2) G 4-31-70 For (4)(13) G 12-72.

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Chilton	Manitowoc River	2, 4, 14		(4)(14) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	A = B = C = D 2-14-72 E = F = G	1 Yes	For (11) G 12-31-74 For(13) G 12-31-72 Amended state order 4B-69-7-6A Issued 4-15-71. Currently under construction.
Cleveland	Centerville Cr., Sheboygan R.			(11) B 3-31-71	G 00		State order 4B-71-060-07 Issued 1-7-71 for preliminary report for clear water exclusion and adequate treatment by 3-31-71. Letter to WDNR dated 11-20-71 stated that violations of clear water ordinance were corrected and that house to house check was continuing.

Clintonville	Pigeon R.
	Wolf R.
		2, 4		(4)
				A 1-71
				B 3-71
				C 5-71
				D 8-71
				E 2-72
				F 3-72
				G 12-72
					(4)
					A =
					B 0
					C 0
					D 4-12-72
					E 0
					F 0
					G
						2 No
						11 No
						9 No
							Revised state order 4B-71-111-08 Issued 7-27-71:
							For (2) D 9-1-71; F 1-1-72; G 3-1-72.
							For (11) G 4-1-74.
							For (4) D 6-1-72; G 1-1-73.
							For (9) G 1-1-73.

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

DATE OF [illegible]
JULY 1, 1972
PREPARED BY
MWDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Cudahy (Water Treatment)	Lake Mich.	7 (S)		7(S) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	7(S) A + B 00 C 00 D 0 E 0 F 0 G		State order 4B-70-052-01 issued 2-27-70 for 7(S): G 12-31-72. Progress report submitted 8-11-71.
De Pere	Fox R.	1, 4, 9		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 9-72 (9) G 9-72	(4) A = B 11-15-71 C 00 D 0 E 0 F 0 G (9) G	1 Yes 2 Yes 13 No	Amended state order 4B-68-113-10A issued 3-5-70 for: (4)(9)(13): G 9-30-72. Preliminary plans for additions to existing treatment plant submitted 11-15-71, but insufficient information for adequate review. Letter requesting additional information sent to city 2-3-72 by WDNR. Resolution requesting extension of completion date to 7-74 was submitted 2-28-72. Regional plan has not been approved

KEY: CONSTRUCTION PHASE [illegible]

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)
(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) [illegible] Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (Cn) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (Za) [illegible] Other,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Solids
(13) Adequate Treatment
(14) Improve Operations
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DATE OF INFORMATION
AUGUST 7, 1972
HWDO

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Fond Du Lac	E. Br. Fond du Lac R. Fox R.	1, 4, 6		(4)(6) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	(4)(6) A = B 4-10-72 C 00 D 00 E 00 F 0 G	1 Yes 2 Yes 11 No	Amended state order 4B-68-111-55A issued 1-30-70 for (4) (6) (11): G 12-31-72. As of 4-27-71, planned to have sanitary sewers televised prior to 12-72 in an effort to locate clear water sources. Full scale phosphorus removal study and a 4 GPM activated sludge pilot plant in operation Has indicated that they can provide 70% phosphorus removal with a temporary facility by 12-72. Estimate completion of expansion program 7-31-74.
Fox River Heights Sanitary District	Fox R.	4 or 8 9		(8) G 12-72	(8) G accomplished		Satisfied requirements of (4) or (8) by connecting to De Pere SD and Green Bay MSD.
Franklin Sanitary District #1	Trib. to Root R.	1, 2, 8		(8) G 12-72	(8) G 12-71	1 Yes 2 Yes	In compliance. Connected to Milwaukee Met.
Germantown	Menomonee River	1, 4, 6 2		(4) D 8-71 E 2-72 F 3-72 G 12-72	(4) D 5-24-72 E = F 0 G	1 Yes 2 Yes	Grant made 1-70. Addition to treatment plant. Amended state order 4B-68-050-11A issued 2-27-70: G(6) 6-71 G(4) 12-72

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

JULY 1, 1970
MWDO

[illegible]	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	[illegible]	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							

Grafton	Milw. R.	1, 2, 4, 9, 11, 13		(4)(13)
				G 12-72
				(9)
				G 7-77
				(11)
				G 12-72
					(4)(13)
					G 11-29-71
					(9)
					G
					(11)
					G
						1 Yes
						2 Yes
							Amended state order 4B-68-051-12A issued 2-27-70:
							For (4)(11)(13): G 12-72
							For (9): G 7-77.

Green Bay Metro Sewerage District	Fox R.	4, 9, 13		(4)(13) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 9-72 (9) G 9-72	 A = B 0 C = D 00 E 00 F 00 G G	1 Yes 2 Yes	WDNR order 4C-68-11a-02 issued 9-2-69: For (4)(13)(9): G 9-30-72 Sewer separation 95% complete. R & D grant for combined municipal and industrial waste pilot plant study completed 1970. Has contracts with American Can Company and Charmin Paper Products Company for joint treatment. 180 day notice issued 5-9-72. Hearing held 6-20-72.
Greendale	Root R.	8		G 12-72*	G 1970		Connected to Milwaukee Met.

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

DISCHARGER'S NAME & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Hales Corners	Hales Corners Creek Root R.	1, 8		G 12-72	G	1 No 2 Yes	State order issued 2-27-70 to connect to Milwaukee MSD by 12-31-72. Letter from Milwaukee MSD indicates connection by 1973.
Kaukauna	Fox R.	1, 2, 4, 9		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 9-72 (9) G 7-77	 A = B 12-2-71 C 0 D 0 E F G	1 No 2 Yes 11 No	Amended orders issued 3-5-70 for (11)(13): G 12-30-72 Preliminary plans for major additions to existing facility submitted. Regional treatment system with Kimberly, Little Chute & Combined Locks; tentatively wastewater from these three villages would be piped to Kaukauna where a new treatment facility would be constructed next to the old one. Report due 11-1-70 not submitted.
Kenosha	L. Mich.	1, 4, 9, 11, 13		(4)(13) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72 (9) B 10-68 G 7-77 (11) 6-1-70	(4)(13) A = B = C = D 10-6-71 E = F 0 G B = G 0	1 No 2 Yes	9B. Tentative program to complete separation of sewers through 1976. Demonstration project on separation of sewers approved 7-10-70. 11, 13B. Report to show that completion of proposed projects will provide adequate treatment by additions. Amended state orders 4B-70- 3 - 3A issued 2-27-70: For (4) G 12-72; For (9) G 12-1-77.

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

AUGUST 7, 1972
MWDO

LAKE MICHIGAN

DISCHARGER SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	[illegible]
WISCONSIN MUNICIPALITIES CONT.							
Kewaunee	Kewaunee R.	4		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(4) A = B 4-1-71 C = D 6-30-72 E 0 F 0 G	1 Yes 2 Yes 11 No	State requires elimination of clear water problem by 12-72.
Kiel	Sheboygan River	2, 4		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(4) A = B 3-14-72 C 00 D 0 E 0 F 0 G	1 Yes 2 Yes 11 No	Survey on Sheboygan River 9-70 states need for elimination of clear water. State order 4B-71-060-18 issued 1-7-71 for (4)(13): B 3-31-71; D 8-31-71; F 3-31-72; G 12-31-72. Extension granted for B 4-28-71: PP due 4-30-71. Preliminary report for clear water exclusion submitted 3-29-71. Preliminary report for STP additions approved 3-14-72.
Kimberly	Fox R.	1, 2; 4, 13		(4)(13) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 9-72	(4)(13) A = B = C 00 D 0 E 0 F 0 G	1 No 2 Yes	Amended state order issued 3-5-70 for (2)(4)(13): G 12-31-72. Satisfied disinfection requirement 10-18-71. Plan for regional treatment system with City of Kaukauna.

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DATE OF [illegible]
AUGUST 7, 1972
PREPARED BY
IWDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	[illegible] ITEMS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Little Chute	Fox R.	1, 2, 13 4, 11		(13)(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 9-72	(13)(4) A = B C 00 D 0 E 0 F 0 G	1 No 2 Yes 11 No	Amended state order 4B-68-11a-29A Issued 3-5-70: For (11) G 12-31-70 (2) G 6-1-70 Got (4)(13) G 9-31-70
Manitowoc	Manitowoc River	2, 4, 6, 11, 13		(4) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	(4) A B 12-11-71 C D 4-6-72 E F 0 G	1 Yes 2 Yes	Amended state order 4B-69-070-10A Issued 4-15-71 for (4)(6)(11)(13): D 9-1-71; F 3-31-72; G 12-31-72. Clear water report submitted 12-1-71.
				(6)(11)(13) A B G 12-72	(6)(11)(13) A = B = G		
Maribel	W. Twin R. Twin R.	None					Grant applied for aerated lagoons and chlorination. Construction completed 5-72.

[illegible]
(1) Sample Flow Report
(2) Disinfection
(3) Secondary Treatment
(4) Phosphorus or Nutrient Removal
(5) New or Expanded Trt.
[illegible]
(11) Include Clear Water
[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
RWDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF CONFERENCE ADD'L REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Little Chute	Fox R.	1, 2, 13 4, 11		(13)(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 9-72	(13)(4) A = B C 00 D 0 E 0 F 0 G	1 No 2 Yes 11 No	Amended state order 4B-68-11a-29A issued 3-5-70: For (11) G 12-31-70 (2) G 6-1-70 Got (4)(13) G 9-31-70
Manitowoc	Manitowoc River	2, 4, 6, 11, 13		(4) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72 (6)(11)(13) A B G 12-72	(4) A B 12-11-71 C D 4-6-72 E F 0 G (6)(11)(13) A = B = G	1 Yes 2 Yes	Amended state order 4B-69-070-10A issued 4-15-71 for (4)(6)(11)(13): D 9-1-71; F 3-31-72; G 12-31-72. Clear water report submitted 12-1-71.
Maribel	W. Twin R. Twin R.	None					Grant applied for aerated lagoons and chlorination. Construction completed 5-72.

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

[illegible] & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE [illegible]	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	[illegible]
WISCONSIN MUNICIPALITIES CONT.							
Marinette	Menominee River	1, 13, 4		(4)(13) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	(13)(4) A = B = C = D = 4-70 E = 5-70 F = 12-70 G =	1 Yes 2 Yes	State order 4B-70-160-03 issued 1-28-70 for G 12-13-72. Grant offered 5-70 for additions to plant. New treatment plant to be in operation by 9-72. Sewer separation is continuing.
Menasha Sanitary District #4	Fox R.	1, 4, 13		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 9-72 (13) G 9-72	(4) A = B = C = D + E + F + G (13) G 12-20-71	1 Yes 2 Yes	Progress report indicated phosphorus removal facility should be in operation by 12-72.
Menomonee Falls	Menomonee River	2, 4, 6 Or 8		(8) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(8) A = B = C = D + E + F + (partial) G	1 Yes 2 Yes	State order 4B-68-5-18A issued 2-27-70 to connect to Milwaukee MSD by 12-72 or provide temporary phosphorus removal by 12-72. Sewers under construction to connect temporary treatment plant to Milwaukee. Discharge to Milwaukee is contingent on completion of Milwaukee sewers connecting the Jones Island & South Shore plants. At present, Milwaukee does not have capacity to accept sewage. There is no proposal to provide phosphorus removal at temporary treatment plant. [illegible] have been made for this work.

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972

MWUO

[illegible]	[illegible]	[illegible]	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE [illegible]	[illegible]	[illegible]
WISCONSIN MUNICIPALITIES CONT.							
Mequon	Milw. R.	8				8 Yes	Connected to Milwaukee Mt. 1969.
Milwaukee Metropolitan Sewer Commission		1, 9, 1		G 7-77	G	1 Yes	Number of grants made for intercepting sewers under construction.
Jones Island Plant (Milwaukee Mat.)	L. Mich	2, 4, 6		(6) A B C D E F G 12-72	(6) A = B = C = D = E = F = G	2 Yes 4 Yes	80% phosphorus removal now provided. The state requirement is 85% phosphorus removal which is to be met with methodology developed through FWQA funded research project. R & D grant for improving phosphorus removal. Grant applicatio made for plant modernization. Under construction.
South Shore Plant (Milwaukee Met.)	L. Mich.	3, 4	•	(3) A B C D 1-71 E 6-71 F 7-71 G 12-72	(3) A = B = C = D 10-29-70= E = F = G	2 Yes	Grant applied for (initial phase of secondary treatment.). Plans and specifications for secondary treatment received 10-29-70. Plans approved for sludge thickener and final clarifier 7-12-71. Presently under construction.

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

JULY 1, 1972
MWDO

DISCHARGER SOURCE & LOCATION	RECEIVING WATERS	PHYSICAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
South Shore Plant (Milwaukee Met) cont.				(4) A B 4-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	(4) A ■ B ■ C 0 D 0 E 0 F 0 G		
Milwaukee (Howard Ave. Water Treatment)	L. Mich	7(S)		A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	A B C D E F G	1 Yes	Has requested authorization to connect to Milwaukee Met.
Milwaukee (Linwood Ave. Water Treatment)	L. Mich	7(S)		A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	A B C D E F G	1 Yes	Has requested authorization to connect to Milwaukee Met.

[illegible]

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE [illegible] REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Mt. Pleasant	Pike R.	8				8 Yes	WDNR held hearing 12-5-67. Sewer lines constructed 5-26-69 to connect to Racine SD.
Neenah-Menasha	Fox R.	1, 2, 4, 13		(4) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 9-72	A = B 11-24-71 C D = E = F = G	1 Yes 2 Yes	Amended state order issued 3-4-70: For (4)(13): G 9-30-72. For adequate solids handling: G 9-1-70. Preliminary plans for treatment facility submitted 11-24-71. Final plans for sludge disposal facility approved 5-2-72. Currently removing 80% phosphorus.
Port Washington	L. Mich	13, 4, 9		(13)(4) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72 (9) G 7-77	A = B = C = D + E + F + G +8-72 G	1 Yes 2 Yes	Grant applied for (secondary treatment and phosphate removal). Have been working on separation of combined sewers since 1968. Secondary treatment facility including phosphorus removal completed.

[illegible] (8) Phosphorus or Nutrient Removal [illegible] (9) Connect to Municipal System (10) Separation or Control of Combined Sewers [illegible] (11) Exclude Clear Water [illegible] (13) Evaluate Present Facilities [illegible]

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

DISCHARGER & LOCATION	RECEIVING WATERS	REMEDIAL STEPS	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADM'L REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Racine	L. Mich.	1, 4, 9		(4) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72 (9) G 7-77	A = B = 12-70 C = D 2-28-72 E 00 F 0 G G	1 Yes 2 Yes	Additions to treatment plant under construction do not include phosphorus removal. Requested a one year extension for completion of phos. removal facility, but was denied 5-4-72. Temporary facility for phos. removal proposed to meet 12-72 deadline. Progress being held up due to no regional water quality management plan approval.
New London	Wolf R.	2, 4		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(4) A = B C D 6-30-72 E 0 F 0 G	1 Yes 2 Yes 11 No	Plans for sewer separation project approved 10-5-70. Sewer separation completed 7-23-71. State order issued 7-27-71 for (4) D 1-1-72; G 1-1-73, For (11) B 11-1-72; G 4-1-74.
North Fond du Lac	Trib. Fox R.	1, 2, 3, 4		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	A = B 00 C 00 D 0 E 0 F 0 G	1 Yes 2 Yes	Amended order issued 1-30-70 for (4)(11): G 12-31-72.

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Oak Creek (Oakview Sub. #3)	Trib. Oak Creek	1, 2, 8		(8) D G 12-72	D 11-70 G 7-25-72	1 Yes 2 Yes	
Oconto	Oconto R.	2, 4		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(4) A = B = C = D = 8-3-7 E F 1-21-72 G	1 Yes 2 Yes 9 No	State requires combined sewer separation by 7-77. Phos. removal facility presently under construction. 75% complete.
Oshkosh	Fox R.	1, 2, 3, 4, 9		(3) D G 12-72 (4) A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72 (9) G 12-77	(3) D 11-1-71 G (4) A = B = C = D 11-1-71 E 0 F 0 G (9) G	1 Yes 2 Yes	Grant offered for intercepting sewer. Amended state order issued 1-30-70: For (2) 5-1-70; For (3)(4) 12-31-72; For (9) 12-31-77. Final plans for secondary treatment with phos. removal approved 1-18-72.

KEY: [illegible]

STATUS OF COMPLIANCE [illegible]
(00) Behind Schedule (Over 1 year)
(*) Contractual Extension Given by State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (Cn) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (O) Oxygen Demand, (Ph) Phenol, (S) Solids, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Water Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Conditions
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

MUNICIPAL SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS INCLUDE REASON FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							

Peshtigo	Peshtigo River	4, 11, 13		(4)(13)
				A 1-71
				B 3-71
				C 5-71
				D 8-71
				E 2-72
				F 3-72
				G 12-72
					(4)(13)
					A +
					B +
					C 0
					D 0
					E
					F
					G
						1 Yes
						2 Yes
						11 No
							Amended state orders issued 4-26-71: For (9) G 12-31-73
							For (11) G 1-1-72
							For (13) D 9-1-71
							F 4-1-72
							G 12-31-72
							Extension granted 2-25-72: For (13) D 5-1-72
							F 6-1-72
							For (11) B 7-1-72
							G 1-1-73
							Will construct joint treatment facilities with Badger Paper Mill. Pilot plant study results for proposed aerated lagoon were certified to EPA 1-21-72.

Plymouth	Mullet R. Sheboygan River	2, 4		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(4) A = B + C = D =7-13-72 E F G	1 Yes 2 Yes	Sheboygan River Survey 9-70 states need for elimination of clear water and adequate treatment facilities. State order issued 1-7-71: for (2) G 5-31-71 For (4)(13) D 8-31-71 F 3-31-72 G 12-31-72 For (11) B 3-31-71

REQ. CONSTRUCTION SCHED. [illegible] Plan [illegible] Final Plans [illegible]

STATUS OF COMPLIANCE [illegible] Schedule [illegible] Schedule [illegible] Schedule (BH) Behind Schedule (over 1 year) (*) Unilateral Extension

REMEDIAL NEEDS (1) [illegible] (2) Disinfection (3) Secondary Treatment [illegible] (4) Phosphorus or Nutrient Removal (5) New or Improved Trt. (6) Plant Expansion (7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (A) Ammonia, Oil, [illegible] Oxygen Demand, (Pn) Phenol, (S) Solids, (8) Connect to Municipal System (9) Separation or Control of Combined Sewers (10) Storm Sewer Treatment (11) Exclude Clear Water (12) [illegible] (13) Adequate Treatment (14) Improve Operation (15) Evaluate Present Fac. (16) [illegible] (17) Advanced Waste Treat.

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DATE OF [illegible]
AUGUST 7, 1972
[illegible]
MWDO

DISCHARGER SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Portage	Fox R.	1, 2 4		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(4) A = B 00 C 00 D 0 E 0 F 0 G	1 Yes 2 Yes	
Ripon	Silver Cr. Fox R.	1, 2, 3, 4		(3)(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(3)(4) A = B 0 C Q D 4-3-72 E F G	1 Yes 2 Yes 11 No	Modified state order issued 1-18-72 for (3)(4): D 7-14-72; G 12-31-73. State requires elimination of clear water problem by 12-71.
Shawano	Wolf R.	4		A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	A B C D E F G	1 Yes 2 Yes 11 No	State order issued 7-27-71: For (4) D 1-1-72; F 4-1-72; G 1-1-73 or connect to Shawano Lake SD. For (9) G 1-1-73. Resolution by city to contract with Shawano Lake 12-9-71. Clear water report submitted 1-13-72. To connect with Shawano Lake SD.

[illegible]

STATUS OF COMPLIANCE
[illegible]
(00) Behind Schedule (Over 1 year)
(*) Conditional Extension

REMEDIAL NEEDS
(1) [illegible]
(2) Disinfection
(3) Secondary Treatment
(4) Phosphorus or Nutrient Removal
(5) New or Expanded Trt.
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride,
(Fe) Iron, (M) Metals, (A) Ammonia, Oil, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of [illegible]
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) [illegible]
(15) Evaluate Present Facilities
(16) Reduction of [illegible]
(17) [illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

[illegible]	RECEIVING WATERS	[illegible]	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF CONSTRUCTION	[illegible]	[illegible]
WISCONSIN MUNICIPALITIES CONT.							
Shawano Lake Sanitary District	Wolf River	2,13, 4		G 12-72	G	1 Yes 2 Yes	Grant applied for (secondary treatment, phosphate removal, chlorination). Final plans for sewer system and secondary treatment facility were approved 9-2-71.
Sheboygan	L. Mich.	4, 9, 2 11, 13		(4) A 6-70 B 8-70 C 3-71 D 6-71 E 6-71 F 7-71 G 12-72 (9) G 7-77	 A = B = C D 6-20-72 E 00 F 0 G G	1 Yes 2 Yes	About 5% of sewers remain to be separated. 180-day notice issued 5-9-72. Hearing held 6-21-72.
Sheboygan - Water Filtration Plant	L. Mich.	7(S)		7(S) B 3-71 . G 12-72	7(S) B 5-19-71 G	1 Yes	

[illegible] (1) Sample After Report (2) [illegible] (3) [illegible] (4) Phosphorus or Nutrient Removal (5) New or Improved Trt. [illegible] (8) Current to Municipal System [illegible] (11) Exclude Clean Water [illegible] (16) Evaluate Present Facilities [illegible]

GREAT LAKES REGION
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

AUGUST 7, 1972
MWDO

[illegible]	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE [illegible] REQUIREMENTS	COMMENTS [illegible]
WISCONSIN MUNICIPALITIES CONT.							
Sheboygan Falls	Sheboygan River	4,11		(4) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	(4) A = B = 8-5-71 C 0 D 12-28-71 E 0 F 0 G	1 Yes 2 Yes 11 No	Sheboygan River Survey 9-70 states need for clear water elimination. City has initiated sewer inspection and elimination program. State order issued 1-7-71: For (4) B 3-31-71; D 8-31-71; F 3-31-72; G 12-31-72. Clear water report submitted 3-3-71. Extension granted for submission of FP until 5031-71. Final plans for phos. removal were approved 3-23-72. No regional water quality has been approved.
Sturgeon Bay	Sturgeon Bay Canal	4, 11		A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	A = B = C D 2-11-72 E F 0 G	11 No	State order 4B-70-100-01 issued 12-15-70: For (4) B 3-31-71; D 8-31-71; F 3-31-72; G 12-31-72. For (11) B 6-1-71; G 12-31-72. Clear water report submitted 5-24-71. Must provide a temporary phos. removal facility if permanent facility is not completed by 12-72.
Thiensville	Milw. R.	1, 2, 4, 11, 13, 9		(4)(11)(13) A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72 (9) G 7-77	(4)(11)(13) A = B = C D 3-14-72 E F 0 G G	1 Yes 2 Yes	State order 4B-68-051-24A issued 10-20-71: For (9)(11): G 7-77 For (4): G 12-72; For (8): G 12-75. Grant applied for (phosphate removal and chlorination). Will connect to Milwaukee Met. Final plans for phos. removal approved 3-14-72. Final plans for water main and sanitary sewer extensions submitted 4-6-72.

(00) Behind Schedule (Over 1 year)
(*) Unilateral Extension
(1) [illegible]
(2) Disinfection
(3) Secondary Treatment
(4) Phosphorus or Nutrient Removal
(5) [illegible] or Improved Trt.
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chlorides,
(8) Connect to Municipal System
(9) Separation or Control of [illegible]
(11) Exclude Clear Water
(15) Evaluate Present Facilities

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DATE OF [illegible]
AUGUST 7, 1972
PREPARED BY
MWDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Southern Colony	Root R.	2, 4		(4)		1 Yes	Determined by State that phosphorus removal not needed.
	Canal, W.			G 12-72	G	2 Yes	If hospital is built they may need phosphorus removal.
	Br. Root R						
South Milwaukee	L. Mich.	2, 3, 4		(3)	(3)	1 Yes	Grant offered for secondary treatment and phosphate
				A	A =	2 Yes	removal 10-8-70. Construction completed.
				B	B =		
				C	C =		
				D 7-68	D =		
				E 6-71	E =		
				F 7-71	F =		
				G 12-72	G =		
				(4)	(4)		
				A 6-70	A =		
				B 8-70	B =		
				C 10-70	C =		
				D 1-71	D =		
				E 6-71	E =		
				F 7-71	F =		
				G 12-72	G =		
							State order 4B-70-5-6 issued 2-27-70 for (13) G 12-31-72.
South Milwaukee Water Treatment	L. Mich.	7(S)		A 1-71	A	1 Yes	Plans to connect to sewage treatment plant.
				B 3-71	B	13 No	Will be in compliance after connection.
				C 5-71	C		
				D 8-71	D		
				E 2-72	E		
				F 3-72	F		
				G 12-72	G		

[illegible]

STATUS OF COMPLIANCE
(=) Ahead of Schedule
(–) On Schedule
(B) Behind Schedule

(BB) Behind Schedule (Over 1 year)
(*) Collateral Extension

REMEDIAL NEEDS
(1) Sample After Report
(2) Disinfection
(3) Secondary Treatment

(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.

(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride,

(Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (O-D) Oxygen Demand,

(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers

(11) Include Storm Water
(12) [illegible]
(13) Adequate Treatment

(14) [illegible]
(15) [illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DATE OF [illegible]
AUGUST 7, 1972
MWDO

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
Two Rivers	Twin R. L. Mich.	2, 4		(4) A B 1-69 C D 6-69 E 6-71 F 7-71 G 12-72	A = B = C = D 6-28-72 E F 0 G	1 Yes 2 Yes 11 No	Grant appliedfor (additions, phosphate removal, chlorination). State order issued 12-15-70: For (4): D 4-31-71; F 8-31-71; G 12-31-72. For (11): B 6-1-71; G 12-31-72. Clear water report submitted 5-27-71. Petition for revision and amendment of order submitted 3-27-72.
Waupaca	Waupaca R.	3, 4		(3) G 12-72	(3) D 11-14-69 E = F = 6-22-70 G	1 Yes 2 Yes	Case was referred to Attorney General 1-2-70. Wolf Drainage Basin hearing July 1, 1971. Proposed order extends schedule deadlines for phosphorus removal. State order issued 7-27-71 for (4): D 1-1-72; G 1-1-73.
				(4) D 1-1-72 G 1-1-73	(4) A B C D E F G 10-71		

[illegible]

(U) Behind Schedule (Over 1 year)
(*) Unilateral Extension

REMEDIAL NEEDS
(1) [illegible]
(2) Disinfection
(3) Secondary Treatment
(4) Phosphorus or Nutrient Removal
(5) [illegible] Improved Trt.
(6) Reduction, Removal or Neutralization of: [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm [illegible] Treatment
(11) Exclude Clear Water
(14) [illegible] Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical [illegible]
(17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DATE OF INFORMATION JULY 1, 1972
PREPARED BY MWDO

[illegible] SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN MUNICIPALITIES CONT.							
West Bend	Milw. R.	1, 4, 13		(4)	(4)	1 No	Amended state order 4B-68-051-25A issued 2-20-70 for (4)(11)(13): G 12-72. Preliminary report on clean water and secondary treatment did not include phosphorus removal.
				A 1-71	A +	2 Yes	
				B 3-71	B =		
				C 5-71	C 00		
				D 8-71	D 0		
				E 2-72	E 0		
				F 3-72	F 0		
				G 12-72	G		
				(11)(13)	(11)(13)		
				A	A +		
				B	B +		
				G 12-72	G		

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADM. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN INDUSTRIES							
Anaconda American Brass Company, Kenosha	L. Mich.	7(Cn,Cd, Cr., Ni, Cu, Zn, Pb, Fe, Phenols)		A 6-70 B 8-70 C 10-70 D 1-71 E F 7-71 G 12-72	A = B = C = D = E F 0 G		Amended WDNR order 4B-68-030-02A for effluent limitation on listed substances, dated 2-27-70.
Badger Paper Mills, Inc., Peshtigo	Peshtigo River	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C = D = 9-30-71 E F 3-27-72 G	1 Yes	WDNR order 4B-70-15-1. Engineer recommends joint treatment with Peshtigo. Preliminary report for evaporation and burning facilities of spent sulfite liquor approved 5-71. FP for sulfite liquor disposal approved 11-29-71. Construction initiated on spent liquor evaporation and burning facility 3-27-72. Results of testing program with the City of Peshtigo for combined treatment presented overall concept of treatment verbally approved 4-28-72.
American Can Company, Green Bay	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	8 A = B = C = D 00 E F 0 G	1 Yes	WDNR order no. 4B-68-11a-1A issued 12-16-69 for (7) or (8). Contract signed for joint treatment with Green Bay MSD 1-18-71. 180 day notice issued 5-9-72. Hearing held 6-20-72.

[illegible] (WD) Revised Schedule (Over 1 year) (*) Unilateral Extension [illegible] (1) [illegible] (2) Disinfection (3) Secondary Treatment (8) Phosphorus or Nutrient Removal (9) New or Improved Trt. (7) Reduction, Removal or Neutralization of: [illegible] (10) Iron, (11) Metals, [illegible] (15) Evaluate Present Facilities (16) Evaluation of All Critical Constituents (17) Advanced Waste Treatment

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

[illegible]
AUGUST 7, 1972
MWDO PREPARED BY

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN INDUSTRIES CONT.							
American Motors (Lake-front Plant(, Kenosha	L. Mich.	8, 15		G 12-72	G 1970		In plant combined sewers no longer discharge to lake.
American Motors (Main Plant) Kenosha	L. Mich.	7 (oil)		G 12-72	G 1970		Plating wastes to Kenosha sewer system. Plans for oil separation facility approved 9-29-70. Large oil separator completed.
Bergstrom Paper Company, Neenah	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C O D O E F O G	I Yes	DNR order 4B-68-11a-3A issued 12-16-69. Company has explored several methods of treatment but would prefer to connect to Neenah-Menasha after pretreatment. 6-30-71 received approval of modified de-inking system. This will cause a modest reduction in BOD and SS.
Charmin Paper Products Company, Green Bay	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	8 A = B = C OO D OO E F O G	I Yes	DNR order 4B-68-11a-6A issued 12-16-69 for (7) or (8) by 12-31-72. Contract signed for joint treatment with Green Bay MSD 1-18-71. 180-day notice issued 5-9-72. Hearing held 6-20-72.

[illegible]

(7) Reduction, Removal or Neutralization of: [illegible]

(8) Connect to Municipal System

(9) Separation or Control of Combined Sewers

[illegible]

GREAT LAKES REGION
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN

AUGUST 7, 1972
MWDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN INDUSTRIES CONT.							
Combined Paper Mills, Inc. Combined Locks (Now known as Appleton Papers, Inc.)	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C 0 D 3-22-72 E F 6-72 G	1 Yes	Amended state order 4B-68-113-68A issued 12-16-69 for (7) or (8). Final plans for primary industrial waste treatment facility approved 3-22-72.
Consolidated Papers, Inc., Appleton	Fox R.	1, 7 (BOD & S) or 8		7 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 A = B = C = D 00 E 00 F 0 G	1 Yes	Modified state order 4B-68-11a-9B issued 5-9-72 for treatment facility by 6-30-73 with effluent characteristics of 35 pounds/ton BOD (maximum 4900 pounds/day) and 20 pounds/ton suspended solids (maximum 2800 pounds/day). Mill may close.
Ft. Howard Paper Company, Green Bay	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 A = B = C = D = E = F = G	1 Yes	Amended WDNR order 4B-68-118 -11A issued 12-16-69 for (7) or or (8). State stipulation amending order to require 90% BOD (10,200 pounds maximum) and 90% suspended solids (27,300 pounds maximum) by 12-31-72 agreed upon 3-4-71. Proceeding with construction.

KEY: [illegible] (10) Detailed Schedule [illegible] REMEDIAL NEEDS (1) [illegible] (2) Disinfection (3) Secondary Treatment (4) Phosphorus or Nutrient Removal (5) [illegible] (7) Reduction, Removal or [illegible] (8) Connect to Municipal System (9) Separation or Control of Combined Sewers [illegible]

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

DISCHARGER NAME & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L REQUIREMENTS	[illegible]
WISCONSIN INDUSTRIES CONT.							
Ft. Howard Paper Company Sewage Treatment Plant	Fox R.	None					In 1969 connected to Green Bay SD, abandoned plant.
George A. Whiting Paper Company, Menasha	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C = D = E F G	1 Yes	Amended WDNR order 4B-68-11a-14A issued 12-16-69: (7) or (8) by 12-31-72. Appears to be making adequate progress toward compliance.
Gilbert Paper Company, Menasha	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C = D = E = F = G +	1 Yes	Amended WDNR order 4B-68-11a-15A issued 12-16-69 Connected to Neenah-Menasha system 7-1-70. All process wastes being discharged to municipal system since rag pulping was discontinued 7-1-71, except water clarifier sludge which can be connected by 7-73.

[illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL STEPS	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN INDUSTRIES CONT.							
Green Bay Packaging, Inc., Green Bay	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	8 A = B = C = D = E = F = G	1 Yes	DNR order 4B-68-11a-17A issued 12-16-69 for (7) or (8) by 12-72. Has been implementing changes since 1970. Latest progress report indicated they are in compliance with water quality standards at nearly all of their outfalls. Indicated that further system improvements to provide capability to handle upset conditions will insure meeting all requirements by 12-72.
Hipke Packing Corp., Cleveland	Centerville Creek	None					
J. I. Case Company, Racine	L. Mich.	13		G 11-69	G = 3-1-70		WDNR reports company in compliance with State and Federal requirements. Treatment facility began operation 3-1-70. Have experienced a few operational failures. Shore protection under construction 7-12-72.
John Strange Paper Company, Menasha	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-60 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C D E F G	1 Yes	Amended WDNR order 4B-68-11a-22A issued 12-16-69 for (7) or (8) by 12-31-72. Concentrated waste waters discharged to municipal system. Further evaluation is necessary to determine if order requirements have been satisfied. Contract not yet signed with Neenah-Menasha Sewerage Commission, however, company is depositing $10,185 per month for use of the Menasha sewer system until contract is signed. Mill is implementing a close-up of its sewer system and elimination of outfalls.

KEY: [illegible]

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DATE OF PREPARATION
AUGUST 7, 1972
MWDO
PREPARED BY

DISCHARGER SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	DEVIATIONS AND/OR REASONS FOR DELAY
WISCONSIN INDUSTRIES CONT.							
Kimberly-Clark, Badger Globe Mill	Fox R.	I, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A B C D E F G =	I Yes	WDNR order no. 4B-68-11a-24A issued 12-16-69. All except a small portion of wastes directed to Neenah-Menasha Sewerage Treatment Plant. Has completed in-plant collection and monitoring facilities of all process wastes to allow all wastes to be discharged to Neenah-Menasha sewerage system when it is enlarged. Present discharge meets State order requirements.
Kimberly-Clark, Kimberly Mill	Fox R.	I, 7(S)		7 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 A = B = C + D =* E = F = G =	I Yes	WDNR order no. 4B-68-11a-25AA issued 3-5-70. * Plans and funding for collection sewers complete. Plans for waste water treatment facilities submitted 2-12-71 and approved on 4-12-71. Contracts have been let and construction is proceeding with no apparent problems in meeting deadlines. Sewer construction essentially complete 7-5-72.

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

[illegible]
AUGUST 7, 1972
MWDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADM'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN INDUSTRIES CONT.							
Kimberly-Clark, Lakeview Mill	Fox R.	1, 7(S) or 8		A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C D E F G =	1 Yes	WDNR order no. 48-68-11a-26A issued 12-16-69. Strong wastes go to city. Others go to primary sedimentation then to river. Clarifiers were approved 5-18-67 and are operational. Present discharges within requirements of order.
Kimberly-Clark, Neenah Division	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C = D = E F = G	1 Yes	WDNR order 48-68-11a-27A issued 12-16-69 for (7) or (8) G 12-31-72. All pulping wastes directed to Neenah-Menasha sanitary sewers. Two-thirds of paper mill effluent to sewage treatment plant. Company indicates it will cooperate with Neenah-Menasha Sewerage District in joint facilities. Has completed in-plant collection facilities under approved plans to allow all waste waters to be discharged to Neenah-Menasha sewerage system when adequate capacity is available.
Kimberly Clark STP	Fox R.	None					
Midwest Breeders, Shawano	Wolf R.	2 and 8 or 13		(8)(13) G 12-72,	(8)(13) G	2 Yes	Wastes to go to Shawano Lake SD.

[illegible]

(8) Phosphorus or Nutrient Removal
(5) New or Improved Trt.

(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride,

(Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand,

(9) Connect to Municipal System
(10) Separation or Control of Combined Sewers

(11) Exclude Clear Water
(12) Screen
(13) Adequate Treatment

(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

JULY 1, 1972
MWDO

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASONS FOR DELAY
WISCONSIN INDUSTRIES CONT.							
Nicolet Paper Corp., West De Pere	Fox R.	1, 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 A = B = C = D = E = F = G = 4-71	1 Yes	WDNR order 4B-68-11a-33A amended 12-16-69. Plant in operation by 3-71. Facilities to consist of a collection system and two clarifiers.
Paper Converting Machinery Company, Green Bay	Trib. Dutchman Creek	5 or 8		G 10-68	G 10-68		10-68: Connected to Green Bay Met.
Peter Cooper Corp., Oak Creek	L. Mich.	5					Connected to Milw. Met. Sew. Comm. 7-5-70.
Peter Cooper Corp. Waste Treatment Plant	L. Mich.	13		A 1-71 B 3-71 C 5-71 D 8-71 E 2-72 F 3-72 G 12-72	A B C D E F G =		Connected to Milwaukee Metro.

[illegible]

STATUS OF COMPLIANCE [illegible]
(BB) Behind Schedule (More 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) Simple After Report
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or [illegible]
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: [illegible]
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) [illegible] Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

DATE OF [illegible]
AUGUST 7, 1972
MWDO
PREPARED BY

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN INDUSTRIES CONT.							
Pine River Dairy Co., Manitowoc	L. Mich	None					Ridge and furrow system and pond for cooling water installed 1970
Riverside Paper Corp., Appleton	Fox R.	1; 7 (BOD & S) or 8		7 or 8 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 or 8 A = B = C = D 11-8-71 E 1-72 F = G	1 Yes	WDNR order no. 4B-68-11a-36A amended 12-16-69. Portion of wastes going to city. Negotiating with city for treatment of balance of the wastes. Appleton Sewage Treatment Plant cannot handle wastes now, but might by end of 1972. Project under construction.
Scott Paper Company, Oconto Falls	Oconto R.	1, 7 (BOD & S)		A 5-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	A = B = C = D = 10-4-71 E F 0 G	1 Yes	Amended WDNR order 4B-69-140-05A issued 7-26-71 for (7) by 12-72. Final plans were approved 12-6-71. Time extension granted for initiation of construction by 6-1-72. Petitioned city for joint treatment 5-1-72.

A-G: CONSTRUCTION STEPS
(A) Preliminary Plans
(B) Final Plans
(C) Financing
[illegible]

STATUS OF COMPLIANCE
(+) Ahead of Schedule
(=) On Schedule
(0) Behind Schedule (Less than 1 year)

(20) Revised Schedule (Over 1 year)
(*) Additional Extension Given By State

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment or Equivalent

(4) Phosphorus or Nutrient Removal
(5) [illegible] Improved Trt.
(6) Plant Expansion

(7) Reduction, Removal or Neutralization of Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide,

(Fe) Iron, (M) Metals, (O) [illegible], Oil, (OD) Oxygen Demand, (Ph) Phenols, (S) Solids, [illegible]

(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment

(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation

(15) Evaluate Present Facilities
(16) Reduction of All Residual Constituents
(17) Advanced Waste Treatment

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GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
DATE OF COMPILATION

MWDO
PREPARED BY

DISCHARGER NAME & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLIONS $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS (REASON FOR DELAY)
WISCONSIN INDUSTRIES CONT.							
Scott Paper Company, Marinette	Menominee River	1, 7 (BOD & S)		7 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 A = B = C = D = 12-2-71 E F . 5-72 G	1 Yes	WDNR modified orders issued 12-14-71 for (7) by 12-31-72. Extension granted on plans to 4-1-71. Research grant on reverse osmosis water reuse.
Shawano Paper Mills, Shawano	Wolf R.	3		G 12-72	G		
Thilmany Pulp and Paper Company, Kaukauna	Fox R.	1, 7 (BOD & S)		7 A 6-70 B 8-70 C 10-70 D 1-71 E 6-71 F 7-71 G 12-72	7 A = B = C = D = 8-10-71 E F 10-18-71 G	1 Yes	WDNR order 4B-68-11a-41A issued 12-16-69. Presently have savealls and lagoons. Final plans for primary and secondary treatment facility approved 9-16-71. Construction proceeding according to engineering timetable Expects to be in compliance by 12-72.
Two Creeks Dairy	Trib. L. Mich.						Factory closed in late 1971.

KEY: [illegible]

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

[illegible]
AUGUST 7, 1972
MWDO [illegible]

DISCHARGE SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN INDUSTRIES CONT.							
U.S. Paper Mill Corp., West De Pere	Fox R.	1, 7 (BOD & S) or 8		7 or 8 G 12-72	7 or 8 G 1971	1 Yes	WDNR order 4B-68-11a-42A issued 12-16-69. Joined De Pere city system in late 1970 and became full time user of facilities in early 1971. Has requested WDNR to review orders persently directed to them.
Wisconsin Electric Power Company, Oak Creek Plant	L. Mich.	1, 13, 7(S)		7, 13 A B C D 3-70 E F 7-71 G 12-72	7, 13 A = B = C = D = E = F = G +	1 Yes	WDNR order for required actions dated 2-27-70. Treatment facilities for solids from wet ash and fly ash handling facilities virtually complete February 1971.
Wisconsin Electric Co., Port Washington	L. Mich.	7(S)		7(S) D F G 12-31-72	D 11-2-71 F G		Extension granted for completion of 7(S) requirement to 9-1-72.

KEY: [illegible]
(P) [illegible] Plans
(F) Final Plans
(C) [illegible]

STATUS OF COMPLIANCE
(+) [illegible] Schedule
(=) On Schedule
(-) [illegible] Schedule
(10) Behind Schedule (Over 1 year)
(*) Unilateral Extension

GENERAL NEEDS
(1) Sample Flow Report
(2) Disinfection
(3) Secondary Treatment
(4) Phosphorus or Nutrient Removal
(6) [illegible]
(7) Reduction, Removal or Neutralization of: Acid (Cl) Chloride
(Fe) Iron, (M) Metals, (N) Nitrogen, Oil, [illegible]
(8) Connect to Municipal System
(9) Separation or Control of [illegible]
(11) Exclude Clear Water
(12) [illegible]
(13) [illegible]
(15) Evaluate Present Facilities
(16) [illegible]

Reproduced from best available copy.

GREAT LAKES REGION

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN

AUGUST 7, 1972
MWDO

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	ESTIMATED TOTAL COST (MILLION $)	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	STATUS OF COMPLIANCE ADD'L. REQUIREMENTS	COMMENTS AND/OR REASON FOR DELAY
WISCONSIN INDUSTRIES CONT.							
Wisconsin Power and Light Company, Edgewater Power Plant, Sheboygan	L. Mich.					I Yes	

[illegible]

(10) Behind Schedule (over 1 year)
(*) Unilateral Extension

REMEDIAL NEEDS
(1) Sample &/or Report
(2) Disinfection
(3) Secondary Treatment
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, [illegible]
(Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, [illegible] (S) Solids
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facilities
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

FEDERAL INSTALLATIONS

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DATE OF INFORMATION
Aug. 1972
PREPARED BY

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN BASIN

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	Present Treatment	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	Pop. and/or 1,000 GPD	COMMENTS AND/OR REASON FOR DELAY
ILLINOIS							
U.S. Navy, Great Lakes Naval Training Center Great Lakes (Lake Co.)	L.Mich.	4 or 8	3, 2	CO 7-72	FI = CO C	S 3500	Construction of the NSSD Gurney Plant is estimated to be completed by February 1974. Connection of the Great Lakes sanitary sewer system to the North Shore Sanitary District will be made after construction of the plant.
	L.Mich.	4 or 8	3, 2		CO 7-72		No phosphorus removal is anticipated before the Great Lakes-North Shore hook-up. Request for funds for phosphate removal has been denied by the Naval Chief of Command.
	L.Mich.	7 (Fe)(M)	None		PP		Concept plans are being initiated for back stop at the Skeet Field and Rifle Range to prevent fire arms from being discharged into the Lake.
	L.Mich.	3	None	CO 7-72	CO 0	I 400	Boiler blowdown contract should be completed by December 1972. Boiler blowdown line will be connected to NSSD sewer system when NSSD plant is finished.
	L.Mich.	3, 2	None	CO 7-72		S 27,500	Water treatment plant filter backwash and sedimentation sludge discharged into the Lake via the storm sewer system. Present plans call for diversion of these wastes to the Great Lakes sanitary sewer system, and then to the NSSD facilities.
Naval Reserve Training Center (Armory) Chicago (Cook Co.)	Chicago Harbor (Inner)	3, 2	None	CO 7-72	CO =	S 8.8	Construction completed to divert Armory effluent to municipal sewer system.

I - Industrial
S - Sanitary

MC - Macerator-Chlorinator
HT - Holding Tank

SB - Settling Basin for removing solids
ST - Septic Tank

SC - Start construction

[illegible] Plans · STATUS [illegible] (PP) [illegible] (OS) [illegible] Schedule [illegible] · REMEDIAL NEEDS (1) Sample & Report (2) Disinfection · (4) Phosphorus or Nutrient Removal (5) New or Improved Trt. · (7) Reduction, Removal or Neutralization of Acid, (Cl) chloride, · (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (Bod) Oxygen Demand, (P) Phosph. (S) Solids, · (8) Connect to Municipal System (9) Separation or Control of Combined Sewers (10) Storm Sewer Treatment · (11) Exclude Clear Water (12) Sewers (13) Adequate Treatment (14) Improve Operation · (15) Evaluate Present Post[illegible] (16) Reduction of All Critical Constituents (17) Advanced Waste Treatment

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REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN BASIN

Aug. 1972

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	Present Treatment	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	Pop. and/or 1,000 GPD	COMMENTS AND/OR REASON FOR DELAY
ILLINOIS							
U.S. Army							
Hq. Ft.Sheridan Ft.Sheridan (Lake Co.)	L.Mich	4 or 8	3, 2	CO 7-72	CO 0	S 542	Concept plans have been completed for diverting Ft.Sheridan effluent from Lake Michigan to North Shore Sanitary District Clavey Road plant. However, the construction completion date will not be before FY 74, because Skokie Valley intercepting sewer is behind schedule.
	L.Mich.	4 or 8	3, 2	CO 7-72			It is not anticipated that phosphate removal facilities will be installed before the tie-in between NSSD and Ft.Sheridan sanitary sewer systems.

I - Industrial
S - Sanitary

MC - Macerator-Chlorinator
HT - Holding Tank

SB - Settling Basin for removing solids
ST - Septic Tank

SC - Start construction

[illegible]

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DATE OF SUBMISSION
Aug. 1972

R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN BASIN

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	Present Treatment	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	Pop. and/or 1,000 GPD	COMMENTS AND/OR REASONS FOR DELAY
INDIANA							
U.S. Coast Guard							
Indiana Harbor East Bkw. C.G. Station (Lake Co.)	Lk.Mich.	None	3, 2		CO -	S .45	In compliance.
U.S. Army							
NIKE C-G Site 32 Chesterton (Porter Co.)	Coffee Creek Little Calumet River, Burns Ditch, Trib. to Lk.Mich.	None	3, 2		CO =	S 7.1	In compliance
NIKE C-G Site 45 Gary (Lake Co.)	Ditch Trib. to Grand Calumet R. to L.Mich.						Not in operation
NIKE C-G Site 47	Ditch Trib. to Burns Ditch to L.Mich.						Not in operation

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ST - Septic Tank

SC - Start construction

[illegible]

STATUS [illegible]
[illegible]
[illegible] Schedule
[illegible] Schedule
(On) Behind Schedule (Over 1 year)
(*) Unilateral Extension Given by State

REMEDIAL NEEDS
(1) [illegible]
(2) Disinfection
(3) Secondary Treatment or Equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of: Acid, (Cl) Chloride, (Cu) Copper, (CN) Cyanide, (Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (DO) Oxygen Demand, (Ph) Phenol, (S) Solids, (T) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) [illegible] Treatment
(14) Improve Operation
(15) Evaluate Present Fac
(16) Reduction of All Other Constituents
(17) Advanced Waste Treatment

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R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN BASIN

[illegible]
Aug. 1972
[illegible]

[illegible]	[illegible]	[illegible]	Present Treatment	Required Construction Schedule	Status of Compliance Construction	Pop. and/or 1,000 GPD	[illegible]
MICHIGAN							
U.S. Coast Guard							
Charlevoix Station Charlevoix (Charlevoix Co.)	Pine River to L.Mich.	14	3, 2		FI = CO 0	S 2.5	Project is under construction to connect Charlevoix Station to municipal sewer system. Estimated time of completion Spring of 1973.
Grays Reef Lt.Station Cross Village (Emmet Co.)	L.Mich.	3, 2	None	CO 7-72	CO 0	S 0.12	Funds have been tentatively approved to automate light station. Estimate completion construction by Spring of 1975. A waiver was requested from the 9th Coast Guard District on proposed water pollution project. The waiver was denied by EPA on this matter and it was requested that holding tanks be provided during this period until automation.
Lansing Shoal Lt.Station (Mackinac Co.)	L.Mich.	3, 2	None	CO 7-72	CO 0	S 0.12	Same as Grays Reef
Menominee Pierhead Light Station (Menominee Co.)	Green Bay L.Mich.	3, 2	None	CO 7-72	CO + 1971	S 0.05	In compliance. Station has been automated and unmanned.
Minneapolis Shoal Light Station (Menominee Co.)	Green Bay L.Mich.	3, 2	None	CO 7-72	CO 0	S 0.12	Same as Grays Reef.
North Manitou Shoal Light Station (Leelanau Co.)	L.Mich.	3, 2	None	CO 7-72	CO 0	S 0.35	Same as Grays Reef
White Shoal Light Station (Leelanau Co.)	L.Mich.	3, 2	None	CO 7-72	CO 0	S 0.12	Same as Grays Reef

I - Industrial
S - Sanitary

MC - Macerator-Chlorinator
HT - Holding Tank

SB - Settling Basin for removing solids
ST - Septic Tank

SC - Start Construction

[illegible]

REGION V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN BASIN

DATE OF INFORMATION
Aug. 1972
PREPARED BY

DISCHARGER SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL REQ.	Present Treatment	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	Pop. and/or 1,000 GPD	COMMENTS AND/OR REASON FOR DELAY
MICHIGAN (Continued)							
U.S. Dept. of the Interior							
Bur. of Sport Fisheries & Wildlife							
Jordan River Natural Fish Hatchery Elmira (Otsego Co.)	Jordan River to L.Mich.	SB	SB	CO 7-72	CO 12/7/71	8,900	Facilities completed 12/7/71

I- Industrial
S - Sanitary

MC - Macerator-Chlorinator
HT - Holding Tank

SB - Settling Basin for removing solids
ST - Septic Tank

SC - Start construction

R E G I O N V
STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS
LAKE MICHIGAN BASIN

DATE OF INFORMATION Aug. 1972
PREPARED BY

[illegible] & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	Present Treatment	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	Pop. and/or 1,000 GPD		COMMENTS AND/OR REASON FOR DELAY
WISCONSIN								
U.S. Coast Guard								
Racine CG. Station Racine (Racine Co.)	Root River	3, 2	ST			S	1.0	The Station has become a seasonal sub-unit of the Kenosha Coast Guard Station. Portapottie service is provided by a private contractor to dispose of the wastes from the RCGS.
	Root River to L.Mich.	3, 2	None			S	0.3	Same as above
Green Bay Harbor Ent. Lt. Station Green Bay (Brown Co.)	Green Bay L.Mich.	3, 2	None	CO 7-72	CO 0	S	0.12	Same as Grays Reef
Kewaunee Pierhead Light Station Green Bay (Brown Co.)	L.Mich.	3, 2	None	CO 7-72	FI = CO 0	S	0.09	Funds provided under continuing program to automate all light stations. Completion of unmanning and automating station during Spring 1973.
Manitowoc Breakwater Light Station Manitowoc (Manitowoc Co.)	L.Mich.	3, 2	None	CO 7-72	CO	S	0.005	Has been unmanned and automated.

I - Industrial
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MC - Macerator-Chlorinator
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SB - Settling Basin for removing solids
ST - Septic Tank

SC - Start construction

(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(13) Adequate Treatment
(14) Improved Operation
(17) Advanced Waste Treatm.

R E G I O N V

STATUS OF COMPLIANCE WITH ENFORCEMENT CONFERENCE REQUIREMENTS

LAKE MICHIGAN BASIN

DATE OF INFORMATION
Aug. 72
PREPARED BY

DESIGNATED SOURCE & LOCATION	RECEIVING WATERS	REMEDIAL NEEDS	Present Treatment	REQUIRED CONSTRUCTION SCHEDULE	STATUS OF COMPLIANCE CONSTRUCTION	Pop. and/or 1,000 GPD	COMMENTS AND/OR REASON FOR DELAY
VESSELS							
ILLINOIS							
U.S. Coast Guard							
Tugboat ARUNDEL Chicago (Cook Co.)	L. Mich.	HT	MC	CO FY 75	CO =	20 P	Connected to municipal sewer system when in port.
MICHIGAN							
U.S. Coast Guard							
Cutter SUNDEW Charlevoix Harbor (Charlevoix Co.)	L.Mich.	HT	HT	CO FY 75		40 to 45 P	Docks at Charlevoix. Is in the design stage for additional HT capacity. City provides sewer connection. No funds have been appropriated.
Cutter WOODBINE Grand Haven (Ottawa Co.)	L.Mich.	3, 2	None			47 P	The vessel has been decommissioned and placed in an inactive status as of February 15, 1972.
Tugboat RARITAN Grand Haven	L Mich.	HT	MC	CO FY 75	CO =	20 P	No longer in Milwaukee. Is now docked at Grand Haven, Mich. Shore tie under construction. Ties into Muskegon sewer system.
WISCONSIN							
U.S. Coast Guard							
Cutter MESQUITE Sturgeon Bay (Door Co.)	L.Mich.	HT	HT	CO FY 75		47 P	City has provided tie-in with vessel.
Ice Breaker EDISTO Milwaukee, Wis.	L.Mich.	HT	HT	CO FY 75	00	160 P	Limited retention in HT. Need additional capacity.

"Number followed by "P" indicates population.

[illegible]
(o) On Schedule
(b) Behind Schedule (less than 1 year)
(bb) Behind Schedule (over 1 year)
(*) Unilateral Extension Given by State
(1) Single Plan Report
(2) Disinfection
(3) Secondary Treatment or equivalent
(4) Phosphorus or Nutrient Removal
(5) New or Improved Trt.
(6) Plant Expansion
(7) Reduction, Removal or Neutralization of Acid, (Cl) Chlorides, (Cu) Copper, (CN) Cyanide,
(Fe) Iron, (M) Metals, (N) Nitrogen, Oil, (OD) Oxygen Demand, (Ph) Phenol, (S) Solids, (TO) Threshold Odor,
(8) Connect to Municipal System
(9) Separation or Control of Combined Sewers
(10) Storm Sewer Treatment
(11) Exclude Clear Water
(12) Sewers
(13) Adequate Treatment
(14) Improve Operation
(15) Evaluate Present Facil.
(16) Reduction of All Critical Constituents
(17) Advanced Waste Treatment

MR. FRANGOS: Mr. Chairman.

MR. MAYO: Yes.

MR. FRANGOS: What are the ground rules here in terms of discussion of the presentation by the EPA? May we do this now, or would you prefer to wait?

MR. MAYO: We will do that now.

We can take it a State at a time in any order that the conferees desire to proceed.

MR. FRANGOS: May I proceed?

MR. MAYO: Yes.

MR. FRANGOS: Mr. Kee, I think that we would agree with your statement in terms of the contention that one needs to communicate the status to the conferees. Certainly there is a benefit in making the status known to the public generally.

I do get a little bit concerned sometimes when we use some of the subjective adjectives in phrasing the progress or lack of progress that we would hope to perhaps offer a little bit more encouragement when we make our presentation to the conference.

But I have a couple of questions relating to the 180-day notice proceedings with respect to two entities in Wisconsin: 1) one, the city of Sheboygan; and 2) the other, Charmin Paper. And I am wondering if you could tell the conference here today what were the results of the conclusion of that action? Sheboygan first.

MR. KEE: In the case of Sheboygan --

MR. McDONALD: Mr. Kee --

MR. KEE: Yes.

MR. McDONALD: -- I think Dale Bryson was the Chairman of that hearing, Tom, and I think maybe he could answer this more appropriately.

MR. BRYSON: As the result of the 180-day notice that was issued to Sheboygan, the State and EPA entered into discussions with the city and the surrounding communities -- and the State of Wisconsin participated in the discussion -- to arrive at a mutually agreeable schedule to have the city of Sheboygan construct adequate secondary treatment facilities with phosphorus control. The city of Sheboygan has developed the detailed schedule that includes a regional concept with outlying communities, has submitted that to EPA and the State. We have agreed that that is a reasonable schedule and the city of Sheboygan is now going forward to install those facilities.

MR. FRANGOS: What are the details of that schedule?

MR. BRYSON: The detailed dates?

MR. FRANGOS: Yes.

MR. BRYSON: I don't have those at my fingertips. Dave, do you have those?

MR. KEE: Phosphorus removal as of September 11, 1972; construction of the phosphorus removal facilities under way with completion well before the December 31, 1972, date.

I may note here, Mr. Bryson, that in preparing to give this report on status of compliance, we utilized the official conference interim deadlines which for phosphorus removal generally called for a mid-1971 start construction date.

Now, although we recognize that phosphorus removal can be installed in a much shorter time — in a year or a year and a half — in all of my statements up to now, when I have referenced a community or groups of communities behind schedule I am speaking, of course, of the official interim dates that the conferees established, and this is the only basis upon which I can make a status of compliance report. Thus, this is the reason, for instance, that Sheboygan would be listed as behind schedule on the official conference requirement, although we recognize that they may well meet the final deadline. In fact we hope that they will.

MR. BRYSON: That will be the case with a number of other municipalities listed under Table No. 6.

MR. KEE: That is true.

MR. BRYSON: And Charmin -- that they may be in compliance.

MR. KEE: Well, primarily this has to do with the phosphorus removal requirement.

MR. FRANGOS: Yes. But, again, we talk about the increase in Federal enforcement activities, and I think, again, it would be helpful if we all understand the full details of the negotiated settlement with the city of Sheboygan, for example.

MR. McDONALD: Well, let's go into those details. Let me go into them as head of the Enforcement Division to the extent I can.

The hearing that was conducted at Sheboygan -- the 180-day notice hearing on June 21, 1972, with Dale Bryson as Chairman of that hearing -- followed the Charmin hearing the previous day. At both of those hearings, well in advance of the hearing, the State of Wisconsin was invited to participate as a full partner in those hearings.

In fact, you and I, I believe, had discussions on this some months ahead. You did have State representation there at the hearing -- both of those hearings. Details were set forth so that we could have followup

D. Kee

negotiating sessions with the city of Sheboygan and with Charmin Paper Company and with American Can and with the Green Bay Metropolitan Sanitary District. Those sessions were held. It is my understanding that at each of these sessions there was State representation in an attempt to come up with the quickest schedules that could come forward consistent with getting the job done.

The Sheboygan schedule was submitted to us. I assume a copy went to the State agency.

MR. BRYSON: Right.

MR. McDONALD: We did notify you, I believe, last week by letter, in addition to notifying the Mayor of Sheboygan, that the schedule that was submitted as a result of those negotiations was approved.

We went through the same situation with the Charmin Paper Products Company, and we are going through the same situation with the other two entities that had 180-day notices in the Green Bay area.

It was my impression here that we tried to work as closely as possible with the State agency in arriving at these agreements.

MR. FRANGOS: I think we have, Mr. McDonald, but I am just looking for -- again, in terms of public education here --

MR. McDONALD: Okay.

MR. FRANGOS: — for what the final schedule was.

MR. McDONALD: Okay. Let me continue on that for a minute, Mr. Frangos, with the city of Sheboygan -- and this will be subject to correction. Mr. Bryson is looking up the details on this now.

MR. KEE: Jim, I have those; if you want me to read those into the record, I would be happy to. It is in three phases --

MR. McDONALD: Very good.

MR. KEE: — and there are sections within each phase.

If you would like, I will go over the agreed-on schedule.

For Phase I, which consists of digester renovation, final plans are to be submitted by September 30, 1972; financing completed by December 31, 1972; start construction by February 1, 1973; and complete construction by May 31, 1973.

Phase II consists of four different items: first is the interceptor connection, and in that case the final plans, January 31, 1973; financing, June 15, 1973; start construction, August 15, 1973; and complete construction, January 31, 1974.

What is entitled the Basin Complex -- a portion of Phase II -- final plans submitted June 30, 1972; financing, December 15, 1973 -- I think that is an error. I think it must be final plans, June 30, 1973; and financing, December 15, 1973; start construction, March 1, 1974; complete construction, August 31, 1975; and final operation and efficiency attained December 31, 1975.

The solids building: final plans, June 30, 1973; financing -- well, it follows along exactly the same as the basic complex. Instrumentation for this phase: final plans, August 31, 1973; financing, December 15, 1973; start construction, May 1, 1974; complete construction, April 30, 1975; and attain final operation, December 31, 1975, along with the basic complex on the solids building.

And then Phase III, which is a plant renovation, but which I understand will not have any effect on the effluent levels attained by the complete facility -- this is Phase III -- has a schedule of final plans, April 30, 1974; financing, October 15, 1974; start construction, January 1, 1975; and complete construction, January 31, 1976; and place in final operation, March 31, 1976.

That, I think, covers completely the agreed-to schedules.

MR. FRANGOS: Okay. Thank you, Mr. Kee.

Now, just very briefly -- I don't want to take too much time here -- with the Charmin Paper Company, my understanding is that this company is scheduled to tie into the Green Bay Metropolitan Sewerage District program, and indeed compliance with the conference deadlines or orders issued by the State of Wisconsin is contingent on the availability of capacity, hydraulic and treatment capacity, at the Green Bay Metropolitan Sewerage Commission.

Now, if you could perhaps indicate the details of that schedule with Charmin.

MR. KEE: Perhaps it would be useful if I could provide a little background information on this discharger.

Charmin Paper Products Company discharges about 14 million gallons a day of sulfite pulp and papermaking wastes containing large quantities of biochemical oxygen demand, suspended solids, and ammonia to the Fox River, which contributes to the degradation of water quality in Green Bay and violates federally-approved interstate water quality standards.

In December of 1969, the firm was ordered by the State of Wisconsin to participate in a joint treatment project with the Green Bay Sewerage District, which was to have been in operation by December 31, 1972, which is the enforcement conference deadline date. Increased cost, due to construction delays, caused the company to reconsider its participation in the joint project, and the project fell 3 years behind schedule.

On May 9, 1972, an 180-day notice was issued to this company, along with the American Can Company, and Green Bay itself. An informal hearing was held on June 20, 1972, and a followup meeting was held on July 14 of this year.

The commitment that the Environmental Protection Agency has received from this firm does call for the execution of a contract with the Metropolitan Sewerage District of Green Bay, for them to complete present in-plant construction projects, including a sewer collection system to tie in with the Sewerage District plant by December 1972; and to reduce the loadings of suspended solids by up to 6,000 pounds a day — I believe this is on direct discharge — by 12-31-73.

If it is okay with the Chair, I would like to insert the complete agreement and the correspondence on this matter into the record of the conference.

MR. MAYO: Any objection?

(The documents above referred to follow in their entirety.)

July 26, 1972

Mr. O. B. Butler
Vice President
Charmin Paper Products Company
Post Office Box 599
Cincinnati, Ohio 45201

Dear Mr. Butler:

I am pleased to inform you that the proposed pollution abatement program, submitted by the Charmin Paper Products Company on July 17, 1972, is accepted by the Environmental Protection Agency (EPA) in satisfaction of the 180-day notice issued to your company on May 9, 1972. The abatement program is summarized as follows:

A. Charmin will execute a contract with the Metropolitan Sanitary District (MSD) and the City of Green Bay which will provide for the MSD to handle an eventual load of:

58,000 pounds of BOD per day
12,000 pounds of SS per day
12 mgd volume - 15 mgd peak.

B. Charmin will complete its one and one-half million dollar construction project now underway including a sewer collection system to tie into the MSD plant by December 1972. It is understood by EPA that the final connection to MSD cannot be made until the MSD treatment facility is completed.

C. After Charmin connects to MSD there will be only one discharge to the Fox River from Charmin's Fox River and East River Mills. This discharge from Charmin's pulp and paper operations will contain a maximum daily loading of 11,000 pounds per day of BOD_5 and a maximum daily loading of 11,000 pounds per day of suspended solids, including settleable solids. Further that the suspended solids discharge, including settleable solids, from all operations, including water treatment,. shall not exceed a maximum daily loading of 15,850 pounds, after Charmin connects to MSD.

D. Charmin will apply the best practicable control technology currently available to reduce loadings by up to 6,000 pounds of suspended solids per day, by removing suspended solids from the water treatment plant. Plans and specifications for the treatment facility will be submitted to the Wisconsin Department of Natural Resources. This work will begin promptly and will be completed by December 31, 1973.

E. Charmin will continue to operate its pollution control equipment at its highest practical efficiency. With regard to Charmin's statement requesting EPA's concurrence that, "Charmin will not be required to provide additional capital investments nor shall EPA impose additional operating restraints on Charmin for its pulp mill waste planned for delivery to MSD during the period prior to the completion of the MSD plant," EPA cannot at the present time, in view of the uncertainty of what future legislation may require, give such a commitment. EPA, can however, state that based upon all information available at this time Charmin will not be required to provide additional capital investment nor does EPA contemplate imposing additional operating restraints on Charmin for its pulp mill wastes planned for delivery to MSD. Should new legislation require any additional capital expenditures or operating restraints, EPA will give Charmin a reasonable opportunity to comply.

This acceptance is based upon the conditions as cited in paragraphs A thru E above.

Your adherence to the approved abatement program will obviate the necessity for referring the matter to the U. S. Attorney General for appropriate legal action under Section 10(g) of the Federal Water Pollution Control Act, as amended, or in the Rivers and Harbors Act of 1899.

This letter represents the best Federal analysis of the requirements which must be met by Charmin for its discharges. The final Federal position as to the acceptability of Charmin's discharges to navigable waters of the United States must be finally determined following comments received as a result of public notice and/or public hearings.

Your cooperation in reaching this agreement is appreciated.

Very truly yours,

ORIGINAL SIGNED BY JAMES O. McDONALD

James O. McDonald, Director
Enforcement Division

THE CHARMIN PAPER PRODUCTS COMPANY

P. O. BOX 599, CINCINNATI, OHIO 45201

July 17, 1972

Mr. Louis Breimhurst
P. E. Director
U.S. Environmental Protection Agency
Region V
7401 Lyndale Avenue, South
Minneapolis, Minnesota 55423

Dear Mr. Breimhurst:

The purpose of this letter is to propose this agreement for resolving the issue between the U.S. Environmental Protection Agency (EPA) and The Charmin Paper Products Company (Charmin) concerning the matter wherein you have alleged that the Green Bay Metropolitan Sewerage District (MSD), American Can Company, and Charmin have violated federal and State water quality standards for Green Bay (Lake Michigan) as set forth in Mr. Adamkus' letter to Mr. E. G. Harness dated May 9, 1972. EPA has informed Charmin that it has not approved or disapproved the State of Wisconsin Department of Natural Resources (DNR) order dated December 16, 1969 establishing effluent limits to the Fox River for Charmin and has suggested that the proposed guidelines for the pulp and paper industry dated June 9, 1972 serve as the basis for establishing effluent criteria.

It is Charmin's understanding that so long as it complies with the limits imposed by the orders issued by the DNR that it will be in compliance with all State and federal laws. However, in the spirit of cooperation with EPA in achieving water quality standards that recognize the best practical degree of treatment, Charmin is prepared to go forward with this agreement. It is agreed that the following provisions constitute full compliance with the federal water pollution control standards for Charmin's integrated paper and pulp mill facilities that discharge into the Fox River, eventually flowing into Green Bay and ultimately to Lake Michigan. The limits for BOD and solids removal stated in this agreement are based upon production of 416 tons per day of sulphite pulp manufactured at Charmin's Green Bay sulphite paper mill, 110 tons per day from its de-inking process (broke) and 471 tons per day of purchased pulp.

1. Charmin reaffirms its intention to continue its active program of environmental control. For the past twenty years Charmin has been continuously working to improve its waste treatment efficiency. Charmin is now achieving an 80% BOD removal and a 90% suspended solids removal. Through in-plant changes in process and equipment, Charmin has achieved a threefold reduction in water usage per unit of production. Since 1957 production has increased nearly threefold without any increase in water consumption. This recycling and reuse of water has resulted in an appreciable decrease in the loadings in the Fox River.

Large capital expenditures have been made for waste treatment facilities so that 90% of suspended solids could be removed and BOD could be reduced by 80%. We understand that reducing the BOD level by 80% represents one of the best records in the Fox River Valley and in the United States for a sulphite mill. These are overall figures for Charmin's combined operation at the East River and the Fox River mills. Discharge to the proposed MSD super plant of the residual pulp mill wastes has been planned as the final phase of an extensive present program for pollution control. Charmin has, from the inception of the proposed MSD super plant, played a major part in the various stages of development of this project.

Charmin is also in the process of installing multi-million dollar air pollution control facilities for reduction of particulates and sulphur dioxide.

2. Charmin will execute a contract with MSD and the City of Green Bay committing Charmin to a yearly expenditure of over a million dollars for twenty years based upon the pulp mill wastes planned for MSD's new super plant scheduled for completion in mid-1975. It is anticipated that the average raw waste load to MSD will amount to:

    41,000# BOD/day
    6,000# SS/day
    12 mgd volume - 15 mgd peak

    The contract will provide for Metro to handle an eventual load of:

    58,000# BOD/day
    12,000# SS/day
    12 mgd volume - 15 mgd peak

3. Charmin will complete its one and one-half million dollar construction project now under way including a sewer collection system to tie into the MSD super plant by December 1972. It is understood that the final connection to the MSD system cannot be made until the MSD treatment facilities are completed.

4. After Charmin connects to the MSD super plant the residual BOD discharged directly to the Fox River will be reduced to a maximum of 11,000# per day which is significantly below the federal guidelines for an integrated sulphite pulp and paper mill. The suspended solids including settleable solids discharged directly to the Fox River will not exceed 11,000# per day which again is significantly below the federal guidelines for an integrated sulphite pulp and paper mill. Further, that the total suspended solids, including settleable solids discharged from all operations including water treatment, shall not exceed a maximum of 15,850# per day after Charmin connects to the MSD super plant.

5. Charmin will use its best efforts to engineer and design a system to reduce loadings by up to 6,000 pounds of suspended solids per day by removing said suspended solids from our water treatment plant. Plans and specifications for the treatment facility will be submitted to the Wisconsin Department of Natural Resources. This work will begin promptly and will be completed by December 31, 1973.

6. Charmin will continue to operate its pollution control equipment at its highest practical efficiency. Charmin will not be required to provide additional capital investment nor shall EPA impose additional operating restraints on Charmin for its pulp mill wastes planned for delivery to the MSD during the period prior to the completion of the MSD super plant.

Charmin would appreciate your acceptance of this agreement no later than July 24, 1972 in order that it can execute its contract with MSD.

THE CHARMIN PAPER PRODUCTS COMPANY

OB Butler
O. B. Butler
Vice President

September 11, 1972

The Honorable Roger D. Schneider
Mayor, City of Sheboygan
City Hall
Sheboygan, Wisconsin 53081

Dear Mayor Schneider:

It is a pleasure to inform you that the proposed schedule reflected in Sheboygan's Resolution No. 188-72-73 has been approved by the Environmental Protection Agency (EPA) in satisfaction of the 180-day notice issued to your community on May 9, 1972 for violation of Lake Michigan Water Quality Standards.

Your adherence to the approved schedule will obviate the necessity for referring the matter to the United States Attorney for appropriate legal action under Section 10(g) of the Federal Water Pollution Control Act.

In order to assess compliance with the schedule, an initial progress report should be submitted to this office by October 1, 1972. Additional progress reports should be submitted within one week after each date set in the approved schedule. During the period that the projects are under construction, progress reports should be submitted the first week of each calendar quarter. Copies of all reports should be sent to the Wisconsin Department of Natural Resources and the Minnesota-Wisconsin District Office of the Environmental Protection Agency.

The cooperation demonstrated by yourself and your representatives during the negotiations resulting in the approved schedule is greatly appreciated.

Very truly yours,

ORIGINAL SIGNED BY JAMES O. McDONALD
James O. McDonald, Director
Enforcement Division

SHEBOYGAN DEPARTMENT OF CITY DEVELOPMEN
CITY HALL 828 CENTER AVENUE SHEBOYGAN WISCONSIN 53081 PHONE 457-50

August 30, 1972

Mr. Francis P. Mayo, Administrator
Environmental Protection Agency, Region V
One North Wacker Drive
Chicago, Illinois 60606

Attention: Mr. Robert Luss, Staff Attorney

Mr. Mayo:

Enclosed please find a copy of Res. No. 181-72-73 by the Common Council of Sheboygan, Wisconsin adopting the proposed project schedule for the Sheboygan Waste Water Treatment Facilities. Also enclosed is a revised copy of the construction schedule that was adopted. The City agrees to stick to the schedule and subsequent activities have already been initiated.

I hope that this enclosure satisfies the EPA and that you will reply accordingly.

F. J. Paquette

Frank J. Paquette
Director

■ SHEBOYGAN CITY PLAN COMMISSION ■ SHEBOYGAN REDEVELOPMENT AUT

1558

Res. No. 157 - 72 - 73 **By Alderman** Falk, Arpke, Kind & Schauer

Dated August 21, 1972.

A RESOLUTION approving the proposed project schedule for the Sheboygan waste water treatment facilities.

~~RESOLVED~~ WHEREAS, the Environmental Protection Agency of the United States Government on May 9, 1972, pursuant to Section 10 (c) (5) of the Federal Water Pollution Act and applicable regulations thereto, issued to the City of Sheboygan a 180-day notification of violation of established water quality standards, and

WHEREAS, in the event the matter is not satisfactorily resolved within 180 days from the date of said notification, abatement action may be brought against the City of Sheboygan, and

WHEREAS, officials of the City of Sheboygan have been meeting with officials of said Environmental Protection Agency and the Department of Natural Resources, State of Wisconsin, to ascertain what necessary remedial action may be taken on a voluntary basis, and

WHEREAS, said officials have agreed that progress made by the City of Sheboygan in its program to provide for the adequate treatment of its waste water is sufficient to permit the federal government to "sign off" on the 180-day notification, subject to adoption by the City of Sheboygan of a project implementation schedule, and

WHEREAS, the attached project schedule has been prepared by the consulting engineers of the City of Sheboygan and has been reviewed by the Department of Natural Resources and the Environmental Protection Agency,

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COMMON COUNCIL OF THE CITY OF SHEBOYGAN that the attached project schedule be and it is hereby approved in all its phases and the City commits itself, with respect to actions within the power of the City and its officials, to adhere to said schedule.

BE IT FURTHER RESOLVED that the appropriate Common Council committee and officials of the City of Sheboygan are hereby authorized and directed to take all actions, including but not limited to, submission of plans and specifications and applications for federal and state grants, necessary to implement said project schedule in all its phases.

BE IT FURTHER RESOLVED that a copy of this resolution be forwarded to the Environmental Protection Agency of the United States Government and to the Department of Natural Resources, State of Wisconsin.

Falk

I HEREBY CERTIFY that the foregoing resolution was duly passed by the Common Council of the City of Sheboygan, Wisconsin, on the 21st **day of** August, **19** 72

Dated August 25 **19** 72 **, City Clerk.**

Approved August 24, **19**72 **, Mayor.**

Proceedings Published **19**

Certified **19** **to**

MR. FRANGOS: I guess the point that I would like to make here is that it is my understanding that because of the recommendations of the conference and at the urging of the State of Wisconsin, the company did with others agree to tie into a regional system, which I think all of us agree is the way to go generally. And it is further my understanding that the company was in a position or would have been in a position by December of 1972 to make a connection to Green Bay. I just have a little bit of trouble when given those factual situations characterizing the company as being recalcitrant.

I think it is incumbent upon us to just use our descriptive terms a little bit more carefully. I am not saying we don't have recalcitrant entities, but I think sometimes we need to be careful with the broad brush.

MR. McDONALD: I would like to comment on that Charmin case in particular, Mr. Frangos, regarding the use of the word "recalcitrants."

It seems to me that Charmin and the American Can Company had contracted with the Metropolitan Sewerage District at Green Bay to do something, and then the costs went up and the contracts were in a state of limbo. At that time, we had negotiations with the State of Wisconsin -- this was in April of this year -- with Green Bay, and with the two paper companies, regarding how they could get back on track. And as a result of those sessions and the fact that they did not reaffirm the contracts because of the escalated costs, we issued 180-day notices. The companies and the Sewerage District were all put on notice.

It seems to me whether we called them "recalcitrants" or not may not be material. But the project had, for all practical purposes, come to a halt until those 180-day notices were issued. Now the contracts have been reaffirmed; the project is proceeding with all due haste, and it looks like a very hopeful situation in the Green Bay area.

MR. FRANGOS: I agree with your comments, Mr. McDonald.

MR. MAYO: Did you have any further comments, Mr. Frangos?

MR. FRANGOS: No, thank you, Mr. Chairman.

MR. MILLER: Mr. Chairman.

MR. MAYO: Mr. Miller.

MR. MILLER: I would like to make a few comments on that -- of course, I note as we go along, and I know full well that reporting on compliance is one of the important aspects of this conference.

As I noted, there was some change insofar as the

Federal installations were concerned in the report. I think and know that we in Indiana have a number of changes, too, that will be made when we report upon status as far as phosphorus removal, and that we have some disagreement over the statements that are provided as far as the percentage. But this is a changing thing, and I am sure that we have more up-to-date data, but we look forward to doing that as we go along.

I would like to point out that two of the 180-day notices in Indiana, to the city of Hammond and to the city of Whiting, were for stormwater discharges of combined sewers to Lake Michigan. I think that most of the other actions that I see are for treatment where these two are really more for combined storm overflows, and the one with the Sanitary District of Hammond certainly does involve treatment as it goes down to the Grand Calumet River and flows west.

I have a little problem, as Tom was saying, with semantics, when you talk about South Bend, and unfortunately saying that South Bend is among the largest cities in the Lake Michigan Basin that does not provide disinfection.

South Bend has disinfection under construction. We have looked at this project in the hopes that we could get in some type of disinfection while under construction. It does not appear to us that this is possible, but I would say other than the adverse effects that we have, as far as the State of Michigan, that the disinfection of South Bend is not in any way affecting the water quality in Lake Michigan itself, and I think that this should be pointed out in connection with the comment which was made.

MR. McDONALD: Mr. Miller and Mr. Frangos, too, and maybe Mr. Purdy and Mr. Blaser -- in terms of this compliance report that was prepared, if there are variances from the individual States -- that is, if more has been done than is reflected in the report that we present here today because the information is either in error or there is additional information available — I have asked Mr. Kee to -- before this conference concludes -- give us an updated report to reflect the current situation. I would hope that if your reports are completed early today or by early afternoon that he will have that report available before the end of the day. But, if not, he will have such a report available prior to the end of the conference, and we will note the differences publicly by coming back up to the podium because I think that is very important.

Much of this information -- if not all of it -- of course, is based upon State records, which we have tried to have verified and reviewed, and we realize that there has been some activity recently which should be incorporated in this report, and we will do that.

MR. MILLER: I have no question in that area, Mr. McDonald, because I know this. We had actions yesterday in Indiana that would affect the report. You must get out a report, and you draw a deadline, and I think this is the purpose of the conference — that we update the information that you have and bring the up-to-date facts to it.

MR. MAYO: Mr. Purdy.

MR. PURDY: Yes.

Mr. Kee, the report that you gave today represents some revisions, and the report was made available earlier for public distribution, and the corrections, as given today, are those that should be in the record, and not the first report.

MR. KEE: That is correct. There were a number of changes -- specifically Michigan -- where we did get comments in time to incorporate them into the final version. And there were some changes that were made, and we have available copies of those revisions and, of course, as we make additional revisions through the day we will have those available.

MR. PURDY: And I would like to, again, point out a comment that Mr. Frangos made. I understand the basis for your Appendix 6, and expect that it does accurately reflect those communities that missed an interim date. But it does not accurately reflect those communities that will miss the December 1972 deadline. The picture is not as bleak as pointed out in that Appendix 6.

MR. KEE: The December deadline, of course, is not here yet. Hopefully, a number of the communities will meet the final deadline. But, on the other hand, the conference with good reason set interim deadlines. From the standpoint of monitoring status of compliance, although I would like very much to project what is really going to happen — and I think we maybe can do that by taking the information that will be presented by the States in trying to project those that will actually be in compliance — I think it is incumbent upon at least me to present to the public and to the conferees where we stand in terms of the official development of just who met those deadlines and who didn't. I appreciate the fact that the reality of the situation may change quickly.

MR. PURDY: I agree on this, but then again I am concerned about those communities that did move forward and prepare final plans and specifications for a so-called permanent installation of phosphorus removal facilities with the hopes that they would receive a construction grant to construct those. In many instances this has not unfolded in the way anticipated.

There are a number of communities that have proceeded now on an interim phosphorus removal program with 100 percent local funds that will meet the December 1972 date, that are listed on Appendix 6, and I want the audience to understand that; I want the news media to understand that, so that this list is not simply printed, and that those communities that have proceeded with 100 percent financing to meet the December 1972 date will not receive a black eye from this conference.

MR. KEE: I think that equity demands that we make that distinction between those two. We will certainly be happy to publish other lists so indicating, as we get the State reports, as we get these identified specifically; we will update this list and make that distinction, because I think it is an important distinction.

MR. McDONALD: Well, I think the distinction that we are talking about here is meeting the phosphorus removal deadline, and how that is met I think is immaterial.

If you say it is going to be met, I think these communities ought to be identified and stricken from this list.

MR. PURDY: Well, we will present that as a part of our information. You have it actually in your detailed report, in some instances, the listing of those behind schedule.

If you look in the table in your full report, it will show that they intend to meet the December 1972 deadline in some instances by interim facilities. It is in the report. It is the way this was pulled out. It does accurately reflect those that missed an interim date, but it does not accurately reflect those that are going to miss the December 1972 date.

MR. McDONALD: Okay. Well, that is something we definitely want to correct on this list: those that are going to meet that date. We will do that before this conference is adjourned.

MR. PURDY: I have a question with respect to the Federal installations. You indicated that those are going to connect to a municipal system. Will that connection be made by December of 1972 and will that municipal system provide phosphorus removal?

MR. KEE: No, sir. Donald Wallgren of our Federal Activities Section will be going into greater detail. But to specifically answer your question: The connection will not be made prior to the deadline but hopefully phosphorus removal will be provided during the interim period until that connection is made. I believe that the State of Illinois probably will comment on the question of whether or not the Sanitary District will meet the final deadline. Our records indicate that they will.

MR. MAYO: Excuse me, gentlemen, I understand there are representatives here from Fort Sheridan and the Great Lakes Naval Training Station who perhaps would be available following Mr. Wallgren's report on corrective actions at the Federal facilities.

MR. PURDY: Another question in your report: You mention the closed system for the U.S. Steel (South Works), and I am wondering if you could define for me what the closed system, in this instance, indicates.

MR. KEE: I believe that that has reference to the fact that there will be no discharge to the Lake Michigan Basin.

MR. PURDY: But this does not mean that there is a closed system and that there is no discharge --

MR. KEE: There is no discharge of surface waters. There is a blowdown discharge, I understand, to the Metropolitan Sanitary District, so it will be closed from the standpoint of the discharge of surface waters.

MR. PURDY: But does not the Metropolitan Sanitary District discharge some surface waters?

MR. KEE: Yes, sir. It is out of place as far as the report is concerned.

MR. PURDY: Well, I think this is a distinction that we ought to make when we talk about a closed system — that there will be blowdown from the system. Is this correct?

MR. KEE: Yes, recycling system might have been a better choice of words. Whenever you have a recycling of a steel situation, such as this, you will have some blowdown that will either go directly to the surface waters or to a Sanitary District for additional treatment.

MR. PURDY: I am somewhat sensitive about it because it has been quoted as a means of reaching a zero discharge in this plant, and I don't think they have quite done that.

MR. MAYO: I think Mr. Purdy's point is well taken. There certainly was no intent to indicate that there has been some new special high level of technology employed in this instance, but that rather the discharge will be removed from Lake Michigan, and through a series of recycling operations, the volume of the discharge is going to be substantially reduced. There will indeed remain a rather significant discharge to the Metropolitan Sanitary District.

MR. KEE: That is correct, although I think it is not significant compared to the present discharge.

MR. MAYO: Mr. Blaser, do you have any comment from the standpoint of the State of Illinois?

MR. BLASER: Not at this time, other than -- do you want a complete review of our situation now?

MR. MAYO: That would come later. I would be interested in your comments when it comes to the opening statement.

MR. BLASER: Well, I think I should add that there really are two different standards of time schedules that we are trying to achieve: 1) one is the schedule of the Lake Michigan Enforcement Conference; 2) the other is that set by the State of Illinois.

Generally speaking, the State of Illinois has set a timetable shorter than the Lake Michigan Enforcement Conference.

The information I provided to you was based on the shorter schedule, the Illinois standards rather than the Lake Michigan Enforcement Conference schedule. And we will have available for distribution a revision showing that some of those that you list as being in violation of Lake Michigan Enforcement Conference schedules are not in violation of those. We will have that for distribution and I will discuss it in my presentation.

MR. MAYO: Mr. Bryson.

MR. BRYSON: Thank you, Mr. Kee.

As you know, the Federal installations that discharge waste into Lake Michigan are also covered by the conference recommendations. It is equally important to focus attention on how the Federal Government is going to achieve full compliance with the applicable recommendations, as well as the other municipalities and industries in the basin.

Mr. Donald Wallgren, Chief of our Federal Activities Program here in Chicago, is here to present a summary of status of compliance of the Federal facilities with the conference recommendations.

Mr. Wallgren.

STATEMENT OF DONALD WALLGREN, ACTING CHIEF, FEDERAL ACTIVITIES BRANCH, SURVEILLANCE AND ANALYSIS DIVISION, U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION V, CHICAGO, ILLINOIS

MR. WALLGREN: Status of Compliance with Enforcement Conference Requirements; first, military installations.

A. Great Lakes Naval Training Center

The Naval Training Center is planning on connecting its sanitary sewer system to North Shore Sanitary District in February 1974 when it is estimated that the NSSD Gurney Plant will be completed. At this point, I would like to point out a change on the report. The Training Center will provide interim phosphorus removal facilities until the connection with NSSD is complete. Funds have recently been approved for this, and the Navy is working towards the completion of these facilities by January 1, 1973.

A project to discharge boiler blowdown water to the sanitary sewer system should be completed by December 1972. Current plans are to divert water treatment plant wastes to the sanitary sewer system by 1974. Concept plans have been initiated for a project to eliminate the discharge of firearms into Lake Michigan.

The Naval Reserve Training Center, Armory Division, has completed their construction to divert the Armory effluent to the municipal sewer system.

B. Fort Sheridan

Fort Sheridan plans to connect its sewer system to the North Shore Sanitary District sewer system for treatment of its wastewater at NSSD's Clavey Road plant in FY 74. This connection is expected when the Skokie Valley interceptor sewer is completed, which is necessary before the connection to the NSSD sewer system can be made.

Here also there is a change from the report that was sent out earlier. Fort Sheridan will provide interim phosphorus removal facilities. It is expected that plans will be approved shortly and they are working towards meeting the January 1, 1972, deadline.

With regard to these two installations, I will introduce representatives of these installations following my report in order for them to give more specific plans.

C. U.S. Army

There are three NIKE sites in the Lake Michigan Basin, one of which is in compliance and the other two are not in operation.

D. U.S. Coast Guard

There are 12 Coast Guard Stations in this basin. One of the stations has a project under construction to connect a municipal sewer system. The Racine Stations have become seasonal stations, and have provided disposal of wastes by Portapottie service from a private contractor. Two of the stations have been unmanned and automated. For the remaining stations, funds to automate have been tentatively approved. However, the estimated completion of construction is not until spring of 1975. A waiver was requested from the Ninth Coast Guard District on the provision of treatment facilities for these installations until they are unmanned. This request was denied by EPA and it was suggested they be equipped with holding tanks and pumpout facilities in this interim period.

E. Vessels

The Coast Guard vessels, when in dock, are connected to the municipal sewer system with the exception of one. These facilities are currently under construction. All vessels at this time have some type of treatment. However, it has been recommended that these vessels install holding tanks with enough capacity so that when they are not in dock, there will be no discharge. One of the vessels has been decommissioned and placed in an inactive status.

F. U.S. Department of the Interior

The Jordan River Fish Hatchery at Elmira, Michigan has completed a settling basin for removal of solids.

This concludes my report.

MR. MAYO: Do the conferees have any questions?

Excuse me, Mr. Wallgren, were the representatives from the Naval Training Station and from Fort Sheridan available to make comments at this time?

MR. WALLGREN: Yes, they are. I will introduce them at this time.

MR. MAYO: Fine.

MR. PURDY: Mr. Mayo.

MR. MAYO: Excuse me. Yes.

MR. PURDY: I am wondering what has happened on the recommendation of EPA on the matter of equipping these stations with holding tanks and pumpout facilities on an interim basis. Has there been a response to that?

MR. WALLGREN: Do you mean on the Coast Guard Stations?

MR. PURDY: Yes.

MR. WALLGREN: We have not received a formal response from the Coast Guard. By way of phone we have been advised that they are planning on providing interim facilities, but we do not have this by way of written response.

MR. McDONALD: When will those interim facilities be provided?

MR. WALLGREN: We understand within this fiscal year, which would mean by July 1, 1973.

At this time, I will introduce Commander Stroh, of the Great Lakes Branch, Northern Division, Naval Facilities Engineering Command, to comment on the specific plans at the Great Lakes Naval Training Center.

STATEMENT OF COMMANDER ALFRED STROH, JR.,
GREAT LAKES BRANCH, NORTHERN DIVISION,
NAVAL FACILITIES ENGINEERING COMMAND,
GREAT LAKES, ILLINOIS

COMMANDER STROH: Mr. Mayo.

In order to meet the Illinois Sanitary Water Board regulations, Congress approved for Fiscal Year 1971 construction the connection of the U.S. Naval Base Great Lakes, Illinois, into the North Shore Sanitary District at a total project cost of $12,209,000. Negotiations began with the North Shore Sanitary District and culminated 14 December 1971 with a contract for the treatment and disposal of all wastes generated at Great Lakes for a maximum amount of $7,500,000. The North Shore Sanitary District is proceeding with construction and their facilities are scheduled for completion in February 1974.

The Naval Base Great Lakes is proceeding with needed on-station work to deliver its sewage to the North Shore Sanitary District. A contract for this work was awarded in June 1972 at a cost of approximately $1 million. The target date for completion is July 1973.

In June 1972 the Navy awarded a contract for the treatment of the Great Lakes water treatment plant filter backwash water and the connection of the Great Lakes steam plant boiler blowdown into the station sanitary sewer system at a cost of approximately $150,000. The target date for completion is December 1972. By this contract the Navy will provide treatment for boiler blowdown and filter backwash water at least 14 months earlier than the scheduled North Shore Sanitary District connection.

In December 1971, the Naval Base requested funding for a treatment facility to reduce phosphates in Lake Michigan sewage effluents until the North Shore Sanitary District facilities are operative.

On 13 September 1972, funding for the phosphate reduction facility at Great Lakes was approved. The proposed time schedule for this project calls for award of a construction contract by 31 December 1972 and completion by 30 June 1973. The possibility of improving these dates is being explored with several chemical companies. According to present plans, all sewage effluents will be diverted from Lake Michigan, for the Great Lakes River Basin, by February 1974.

Are there any questions?

MR. McDONALD: Commander Stroh, could you repeat those dates for when the phosphorus removal will be on line again — the interim phosphorus removal?

COMMANDER STROH: Well, we just received approval from the station military construction fund — the same source will be used for the construction that was approved on 13 September. So commencing now, why, we are selecting an A and E to develop plans and specs.

Now, our schedule, at this time, is to have the plant inspection completed in November of 1972; make a contract award sometime in December of 1972. We have an outside completion date for construction of phosphate treatment of 30 June of 1973.

MR. McDONALD: Is that the permanent phosphorus removal in June of 1973 or is that interim?

COMMANDER STROH: That will be interim. Since we are getting out of the lake completely, permanent compliance will be achieved when we connect to the North Shore Sanitary District.

We have had some difficulty getting approval for this project because it was not contemplated at the time we asked to take all of our effluent out of the lake. So Washington, our Navy Department, has reconsidered, and has decided to allow us to use approximately $70,000 to provide this interim treatment. That will be the interim solution. There will be a question what we can do with that equipment. It will be used for just a short time — you might say from 1973 to 1974.

MR. McDONALD: What type of removal would this be? How are you going to effect this?

COMMANDER STROH: We plan to erect a tank containing alum and will inject the alum into the sewage treatment system.

We estimate that we will have to buy chemicals that will cost $50,000 a year for this operation. We are considering getting another employee to provide this service, and attach it to the Public Works Center.

Operational costs are estimated, at this time, at about $100,000 a year, but we are going ahead, and they should be completed and in operation in the spring of 1973.

MR. McDONALD: How much are the capital improvement costs? How much construction would be involved?

COMMANDER STROH: Our estimate now is $70,000.

MR. McDONALD: You know the one problem I think we have in the Federal establishment -- and I am surprised at the Federal conferees or the State conferees in the likeness of their question -- but I think the one question we always have in the Federal establishment is that if the Federal Government doesn't come forward as quickly as it can, we are the Achilles' heel in this whole pollution abatement.

It would seem to me that anything that Great Lakes can do to accelerate that date by all means ought to be done, and we would like to offer you some of our technical assistance to see what we could do to expedite the on-line delivery of that phosphorus removal. I will suggest right now that if your technical people want to contact our David Welch, he has, I think, some innovative ideas that could and may well result in expediting that date. We would like to work toward that end to get as close to December 31 as we can, and as far away from June 30 as we can.

COMMANDER STROH: We are doing that, and I appreciate the advice.

We have to operate within the contract regulations to give everyone an opportunity, but we will work with your people in an effort to improve this date.

MR. McDONALD: Very good.

MR. MILLER: Mr. Chairman.

MR. MAYO: Mr. Miller.

MR. MILLER: I can't help technicating for a minute. All these installations, Commander, are on the lake shore, are they not?

COMMANDER STROH: Yes, sir.

MR. MILLER: What are you going to do with the sludge after you precipitate it out?

COMMANDER STROH: You mean from the phosphates?

MR. MILLER: Yes.

COMMANDER STROH: I will ask Mr. Stahl to answer that question.

MR. STAHL: We are presently lagooning it. No sludge processing is done —

MR. MAYO: Would you come up to the podium, please? Please identify yourself.

MR. STAHL: Matt Stahl from Great Lakes.

Presently all of our sludge processing is done at our secondary plant on the west side of the basin, which does not discharge into Lake Michigan, and it is anticipated that during this interim phosphorus treatment that we would continue in the same manner.

The design is not completed; it is only in a very preliminary stage.

MR. MILLER: You say these are lagoons?

MR. STAHL: We are presently lagooning our sludge, yes, after treatment, of course.

MR. PURDY: Mr. Mayo.

MR. MAYO: Yes.

MR. PURDY: I would like to inquire as to the average resident population of this center. Are we talking about a few hundred people, a few thousand, or what?

MR. STAHL: Approximately 35,000.

MR. PURDY: 35,000?

MR. STAHL: Yes. Now all are not residents; about 25,000 are full-time residents.

MR. PURDY: Thank you.

MR. MAYO: Are there any other comments or questions?

Thank you very much, gentlemen.

MR. WALLGREN: At this time, I will ask that Captain Huff of the U.S. Army discuss the plans at Fort Sheridan for their interim phosphorus removal facilities.

STATEMENT OF CAPTAIN FREDERICK HUFF, CHIEF, LANDS OFFICE, OFFICE JUDGE ADVOCATE GENERAL, U.S ARMY, WASHINGTON, D.C.

CAPTAIN HUFF: Ladies and gentlemen --

FROM THE FLOOR: Mr. Chairman, we are having difficulty hearing back here.

MR. MAYO: Would you speak directly into the microphone?

CAPTAIN HUFF: I would be glad to.

I am Captain Huff from the Office of the Judge Advocate General from the Department of the Army in Washington, and I am here on behalf of Fort Sheridan and the U.S. Army.

We have been engaged in this program for awhile, too. Our original plan was submitted for the Fiscal Year 1971 budget. With the consolidation of the Fourth Army and the Fifth Army, there was some question as to what would be the status of Fort Sheridan.

At that time, the original plan was to remove the military construction budget for the year, and the soonest that it could be reinserted was FY 1973, which is this year.

This line item for connection to the Clavey Road plant of the North Shore Sanitary District is now before the Congress. It has been the general rule that the moneys are made available roughly in November of the year, which is November 1972 that we are now talking about. And we expect that the project will be completed to connect Fort Sheridan with the Clavey Road plant in February of 1974, which is, of course, the fiscal year of 1974.

We have also begun an interim plan -- and there is an urgent military construction bill now before Congress roughly in the amount of $70,000 -- to provide for interim treatment. It was submitted sometime ago. We expect approval will be forthcoming shortly.

We have not had any difficulty in the past in getting moneys for these kinds of projects, so we suspect that it will come soon.

We will proceed as rapidly as possible with that project. It takes roughly 90 days from the time of funding until the bids are presented, and roughly 2 months construction time after that to measure competitive bidding and purchase of equipment. So that provided it doesn't freeze solid as a rock for the whole rest of the year, we should have no particular problem with getting the thing done.

Fort Sheridan currently has about half a million gallons a day of sewage. We have already implemented a program to stop the use of phosphate detergents in the laundry on the post. We have turned to low phosphate detergents and low phosphate detergents are now sold at the commissary, which, for those of you who are not familiar, is the military store. So the military housewife is now buying low phosphate soap and is using it at home in her washing machine. We are hoping that this will assist us even more in reducing the level of phosphates.

Now I have only one other comment, that being that our major impediment, of course, is connecting with North Shore before completion of that plant. We are ready to go. When they are done, we will be ready to connect.

We have — to answer a question in anticipatory manner — we have a population of roughly 4,000 at Fort

Sheridan. That includes both the military and their dependents. The population is relatively stable at this point. It has been much higher, and I suppose it could get much lower. But that is where it stands at this point.

I would be very happy to answer any questions that I can at this point.

MR. MAYO: Mr. McDonald.

MR. McDONALD: Captain Huff --

CAPTAIN HUFF: Yes, sir.

MR. McDONALD: -- assuming that you get your appropriation in November, when would the phosphorus removal facilities be in operation?

CAPTAIN HUFF: If everything went well, 5 months would be April. That would probably be the soonest. That is provided we get going before the hard freeze of wintertime. It is very difficult to do the construction, of course, in the wintertime in Chicago.

MR. McDONALD: Again --

CAPTAIN HUFF: That and the equipment are the major impediments.

MR. McDONALD: Again I would offer the technical assistance of our man, David Welch.

CAPTAIN HUFF: We would be most happy to have it, I am sure.

MR. McDONALD: We would leave this at your initiative, and any way that he connects with that kind of project he will do his best.

CAPTAIN HUFF: We are most appreciative of that.

MR. McDONALD: I have one other question also. It is sort of a followup to a question that we asked Mr. Poston. You say that the laundry is now using phosphate-free detergents.

CAPTAIN HUFF: Low phosphate.

MR. McDONALD: I thought you said the commissary was selling low phosphate but the laundry --

CAPTAIN HUFF: By directive we are using low phosphate detergents in the post laundry, and we are selling low phosphate detergents in the commissary on the post.

MR. McDONALD: Is this a general policy throughout the Navy now?

CAPTAIN HUFF: Well, I am in the Army. (Laughter)

MR. McDONALD: Excuse me.

CAPTAIN HUFF: I don't know about the Navy.

MR. McDONALD: You know since the services have tried this new approach now, and they don't wear uniforms, it is hard to tell the difference.

CAPTAIN HUFF: We all work for the same government, but we don't speak!

MR. McDONALD: I am sorry?

CAPTAIN HUFF: We work for the same government but we don't speak to each other!

MR. McDONALD: Maybe we ought to start wearing uniforms. (Laughter)

CAPTAIN HUFF: I would go for that.

It is increasingly popular in the Army to do this kind of thing at the urging of a great number of persons including myself. I do not have any great power but, you know, we do our bit, and we are trying to more and more encourage the use of low phosphate detergents and soap -- not just in Chicago either but in places where phosphate contents are not quite so much in controversy as here. We are looking to do as much as we can to clean things up. Most of the people in the Army at this stage are probably about my age anyway. We are young people who are most interested in this whole business.

MR. McDONALD: You say you don't get much power. When I was a Private First Class and I saw a Captain, he was an awesome individual, so don't sell yourself short!

MR. MAYO: Are there any other comments from the conferees?

MR. FRANGOS: Captain --

CAPTAIN HUFF: Yes, sir.

MR. FRANGOS: — do you have a contract signed with the North Shore Sanitary District?

CAPTAIN HUFF: No, we do not at this point, sir.

Part of the problem is that everybody wants the money up front. We have to have money.

MR. FRANGOS: Okay. Thank you.

CAPTAIN HUFF: May I answer anyone else's questions?

MR. MAYO: Are there any other questions, gentlemen?

Thank you very much, Captain.

CAPTAIN HUFF: Thank you very much for the opportunity.

MR. MAYO: We will take a 15-minute recess. We will be back here at 11:35.

(Short recess.)

MR. MAYO: Ladies and gentlemen, to continue with the agenda, we have reached the point of receiving the reports of the individual States.

The usual procedure is for each State — as I mentioned in the opening comments — to manage its own time. Generally one request we have made is that when a party from an individual State has comments to make about the conference in general or about circumstances in more than one of the States, perhaps it is more appropriate for those comments to come at the end under the public section rather than as part of the commentary from one of the individual States.

The order in which we will have the State presentations will be Illinois, Indiana, Michigan, and Wisconsin.

Following that, there will be time for public presentations.

If Illinois is ready, we can proceed with the Illinois presentation at this point.

STATEMENT OF WILLIAM BLASER, DIRECTOR,
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,
SPRINGFIELD, ILLINOIS

MR. BLASER: If I may, I will just make my presentation from this spot.

David Currie joined us a few minutes ago and he will be back. He is the Chairman of the Illinois Pollution Control Board.

For the background information, for those of you who are unfamiliar with the Illinois system, Illinois has not one pollution control agency but three: The Institute for Environmental Quality, which is a research institute;

the Pollution Control Board, which is the standards-setting and judging group -- David Currie, Chairman; and the Illinois Environmental Protection Agency of which I am Director, which is the enforcement and service arm.

As far as the background of the compliance schedule here in Illinois, the lake is important to the people in Illinois. Not only is it the water supply for Chicago but for the suburbs as well. It represents the public water supply for roughly half of the population of the State.

Concern for a clean lake here in Illinois goes back to near the turn of the century when first the Metropolitan Sanitary District of Greater Chicago began converting sewage effluent away from the lake down to the Illinois River. More recently the Illinois Sanitary District has embarked on a similar system and construction is well under way. Progress is being made. We have new effluent standards and we have a program in Illinois calling for complete diversion of all wastewater away from the lake. The construction program is well under way, but until then we are requiring disinfection and phosphate removal.

Generally speaking, Illinois point sources are on schedule with the Lake Michigan Enforcement Conference recommendations. Part of this is because the Illinois standards set a tighter time schedule, as I mentioned earlier in the morning — a tighter timetable than that required by the Lake Michigan Enforcement Conference.

The original list that was provided to the Federal Government was based on the tighter of the two timetables, and in order to make the material more comparative with the rest of the States, we have provided and do have available to anyone interested a revised schedule showing Illinois sources generally in compliance.

We also have prepared, again available for those who are interested, a brief summation of the comparison between the Lake Michigan Enforcement timetable and the Illinois State timetable.

In terms of progress, as far as disinfection, the point sources in Illinois not discharging to the Illinois River system are in full compliance with disinfection. Further, as far as phosphorus removal, as far as the Lake Michigan Enforcement Conference requirements — these are either in operation or are on schedule where we feel there is no doubt they will meet the December 1972 requirements.

As far as the industrial, generally speaking, this is on schedule, or some form of enforcement proceeding is in progress. Some of these are under compliance schedules through the circuit courts of Illinois which do not match the compliance schedule of the Lake Michigan Enforcement Conference. However, we are bound by the circuit court decisions and the companies involved are on schedule with those circuit court schedules.

As far as upgrading of sewage treatment, this refers primarily to the North Shore Sanitary District, the one remaining unit that discharges effluent to the lake. They have a construction schedule of $116 million worth of construction in process right now. This is behind schedule. It is behind schedule because the whole complex of North Shore Sanitary District problems had to be resolved through consolidation in a case before the Pollution Control Board which over a year ago resolved it and it is now moving, but moving behind schedule.

We have here today Mr. Byers from the North Shore Sanitary District who will outline in greater detail the situation in that important portion of the Illinois discharges.

Last is the question of combined sewer overflow. Generally speaking, here we have an accelerated deadline on the part of the Pollution Control Board.

There have been questions raised as to the feasibility of achieving those deadlines, particularly until the Federal financing question is resolved. Even if Federal financing were to be available tomorrow, the timetable looks very tight to us, and we have committed ourselves to raising the question with the Pollution Control Board for review of the accelerated Illinois timetable. But in preparation for that we are having the Research Institute of Illinois do a study to better assess, better determine the facts on those deadlines.

Now, since the remaining sewage effluent discharges into the lake are within the scope of the North Shore Sanitary District, if it would be appropriate, I would like Mr. Byers, the General Superintendent of the District, to outline the situation now.

Is this acceptable, Mr. Mayo?

MR. MAYO: Yes.

Would you introduce yourself, please, Mr. Byers?

STATEMENT OF H. WILLIAM BYERS,
GENERAL MANAGER, NORTH SHORE SANITARY DISTRICT,
CHICAGO, ILLINOIS

MR. BYERS: I am H. William Byers, the General Manager of the North Shore Sanitary District. And, Mr. Mayo, I would like to read the prepared statement that I had made for this conference.

MR. MAYO: Please proceed.

MR. BYERS: At the first meeting of the four-State conference which was convened on January 31, 1968, the late Raymond E. Anderson presented a statement outlining the plans of the North Shore Sanitary District to construct the facilities necessary to protect the waters of Lake Michigan. A major feature of these plans was the proposal to divert all effluents from Lake Michigan and discharge them to the Des Plaines River. The effluent from the Clavey Road Sewage Treatment Plant was also to be pumped to the Des Plaines River. Stormwater overflows would be controlled by the construction of retention basins at Clavey Road, Highwood, North Chicago, Waukegan, Zion, and Winthrop Harbor. The basins would retain most of the storm flows and return them to the intercepting sewers, after the flow subsided, for subsequent treatment at the sewage treatment plants. Amounts in excess of the capacity of the basins would be settled and chlorinated before being discharged to the receiving waterway. The cost of the entire project was then estimated to be about $58 million. Various delays and changes in effluent and water quality standards have since resulted in escalation of the total project cost to about $116 million.

On May 4, 1968, the voters of the District approved a $35 million bond issue, the maximum amount permitted under the Sanitary District Act of 1911. Subsequently, the District applied for a Federal construction grant and, after passage of the State antipollution bond issue, for a State grant also. To date, (August 31, 1972), State and Federal grants amounting to about $51.7 million have been offered. About $3.1 million of this amount has actually been received by the District.

Significant delays in implementing the foregoing plans were caused by difficulties in obtaining a site for a third major plant near Gurnee and, in particular, by prolonged litigation instituted by persons opposing the expansion of the Clavey Road plant. Delays were also caused by successive revisions to the water quality and effluent statndards, which have recently (March 7, 1972) been extensively revised by the Illinois Pollution Control Board.

In October 1970, the District authorised its consulting engineers to develop a long-range plan for sewage disposal for the District, and the remainder of Lake County, taking into account restrictions on future expansion of the Clavey Road plant as imposed by court order. The completed report was accepted in November 1971.

As a result of the litigations, rulings by the Illinois Pollution Control Board, delays related to an Environmental Impact Statement by the U.S. Environmental Protection Agency and the long-range plan recommended by the consulting engineers, a number of changes have been made in the original plans of the District. They are summarized briefly, as follows:

1. Advanced waste treatment facilities for sewage tributary to the Waukegan plant will be constructed at Waukegan instead of at Gurnee. The effluent will be discharged to the Des Plaines River as originally planned.

2. The Gurnee Sewage Treatment Plant will treat sewage from Great Lakes Naval Training Center and from part of Lake County west of the District boundaries as well as that from the upper Skokie Valley, North Chicago, Gurnee and vicinity. An agreement with the Navy has been reached and negotiations with Lake County are proceeding.

3. Stormwater storage and treatment facilities at Highwood will not be constructed. This wastewater will be conveyed instead to Clavey Road for storage and treatment.

4. The capacity of the Clavey Road plant will be limited to 17.8 mgd and elaborate odor control facilities will be provided. The effluent will continue to be discharged to the Skokie River instead of to the Des Plaines River as previously planned.

5. Additional capacity for the southern part of the District, when required, will be provided at a new plant to be located at the Des Plaines River near the Lake-Cook County line road. This plant will also serve part of Lake

County west of the District boundary.

6. All sludge dewatering facilities for the District will be located at Waukegan. The dewatered sludge will be disposed of in a remote landfill instead of by incineration.

In addition to planning and constructing facilities for the long-range plans of the District, considerable effort and funds have been devoted to providing interim facilities for disinfection and phosphorus removal at the plants presently discharging effluents into Lake Michigan. Phosphate removal has been accomplished at the Waukegan plant since September 1, 1971, utilizing ferric chloride and an anionic polymer. The concentration of phosphorus in the effluent has averaged below 1.0 mg/l. Equipment to feed alum is presently being installed at five small lakefront plants and the North Chicago plant. This equipment will be installed and in operation to remove phosphorus prior to December 31, 1972. This will have the side benefit of obtaining a higher degree of removal of BOD and suspended solids.

The polishing pond at Clavey Road plant has been completed and the District is doing a much higher degree of treatment during the construction of this plant. A contract is also awarded for the construction of the necessary equipment to treat chemicals to obtain an even higher degree of treatment during construction at the Clavey Road plant. This contract for chemical treatment equipment will be completed prior to December 31, 1972.

An extensive program of laboratory and pilot plant studies has been conducted to determine the most suitable methods of advanced waste treatment to comply with the new effluent and water quality standards.

The substantial progress made by the District is attested to by the fact that about $40 million in construction work is under contract or has been completed. Plans and specifications for an additional $21 million in construction work are essentially ready for review by the Illinois EPA. This work will be under contract as soon as possible.

Thank you very much.

MR. MAYO: Are there any questions or comments that the conferees have of Mr. Byers?

MR. McDONALD: I have a question, Mr. Mayo.

On page 3 of your statement, Mr. Byers, you indicated, item 6, that: "The dewatered sludge will be disposed of in a remote landfill instead of by incineration."

I understand that the project is currently designed for incineration, and you are now preparing an Environmental Impact Statement to dispose of it by landfill?

MR. BYERS: Originally the plans were completed to dispose of it by incineration. The plans have in the last years been revised, and we are under construction with the sludge dewatering facilities and have obtained a State of Illinois EPA permit for operation of a landfill.

MR. McDONALD: Has an Environmental Impact Statement been prepared on the landfill site?

MR. BYERS: The statement has gone -- yes -- has been prepared and submitted to the State.

MR. McDONALD: I see.

It has not yet been received by the Federal Government?

MR. BYERS: I am not sure.

MR. McDONALD: Well, the sooner that statement gets to us, the quicker we can move on that end of the project.

I have another question, Mr. Byers. Were the swimming beaches open at Lake County this past summer?

MR. BYERS: I believe the beaches were posted by Lake County Health Department as closed all summer long.

MR. McDONALD: In your judgment, when will the beaches be open in Lake County?

MR. BYERS: Well, I think, according to the program, substantial changes in the beach should happen in 1973 and 1974; part of it, the higher degree of treatment going on at Waukegan now -- there has been some improvements.

However, the small lakefront plants are phased in the latter part of 1973, early part of 1974, to be taken off completely, and I think that is when you get the big increase on the beach.

MR. McDONALD: Is there chlorination now on the lakeside plant?

MR. BYERS: Yes, we chlorinate both the regular sewage and also the stormwater.

MR. McDONALD: Do you see any possibility of those beaches being open next summer as the result of actions by the District?

MR. BYERS: No. The changes that are coming about will be programmed to come on line really after the summer of 1973.

MR. McDONALD: So, in your judgment, it is just physically impossible to do anything additional to get those beaches opened by next summer.

MR. BYERS: Right. We are going, of course, obviously -- which I have already said -- ahead with the phosphate removal which will give us additional BOD and suspended solids. However, I think the total answer to the beaches on Lake Michigan, in Lake County, is the completion of the total program. And I think to say that you are going to see substantial change prior to the completion of that would be in error.

MR. McDONALD: When, then, would you see the beaches open?

MR. BYERS: Probably in the middle of 1974.

MR. McDONALD: Thank you.

MR. BLASER: May I ask a question, Mr. Byers?

Some people have raised the question that even though Clavey Road plant is not yet complete the facilities are now nearly complete to pump some of the effluent from some of the shore plants over to the Clavey Road plant.

Would you care to comment on the desirability or lack thereof of diverting that sewage even though Clavey is not yet complete?

MR. BYERS: Well, on the Clavey Road, the contracts as presently awarded will bring that plant up to a 17.8 mgd plant as a full secondary plant, followed by the polishing pond.

These contracts that are awarded and are under construction right now are due to be completed in September and October of 1973. Until these particular contracts are completed, plus the construction of a relief sewer in the middle part, which is also scheduled for the latter part of 1973 for completion, there is not adequate capacity to handle any one of the particular lakefront plants. So we have to live with the situation as it is, and keep pushing to complete the contracts presently under way.

MR. BLASER: All right, but it is not a shortage of transport capacity now, or is it?

MR. BYERS: Well, let me back off here and explain it to you this way. The three plants at Highland Park -- the pump station is approximately 90 percent complete, probably 95 percent complete -- will be on line, be tested within the next 2 or 3 months. The contract to connect the three small plants together has just been awarded. I would expect the contractor to construct on that intercepting sewer this fall until late into the winter when it finally gets stopped, and to complete construction next spring.

The amount of flow and the piping arrangement is such that at Perry Avenue even when the pump station is on line, we will not be able to take that flow from Clavey Road until we finish the additions that are being accomplished.

When you move on up to Lake Bluff and Lake Forest, we have to get additional relief capacity in the intercepting sewer before we will be able to convey that properly to the Clavey Road plant.

MR. BLASER: Then, even though the Lake Forest plant -- the pumping station -- those facilities are 99 percent complete, you cannot in good conscience divert effluent from that to the Illinois River watershed without adequate Clavey Road treatment?

MR. BYERS: That is correct.

MR. MAYO: Are you through, Mr. Blaser?

MR. BLASER: Yes. Thank you.

MR. MAYO: Are there any other questions of Mr. Byers?

MR. BYERS: Thank you.

MR. MAYO: Thank you very much, Mr. Byers.

MR. BYERS: Thank you.

MR. MAYO: Mr. Blaser, do you have any other --

MR. BLASER: We have one other gentleman to make a presentation, James C. Vaughn, who is the Engineer in charge of the Water Purification Division for the City of Chicago. Mr. Vaughn has been with us for many years. He is just retiring. This is his last official presentation -- at least of this District.

There are copies for the conferees, and I think Mr. Vaughn has some additional copies.

STATEMENT OF JAMES C. VAUGHN,
ENGINEER OF WATER PURIFICATION,
DEPARTMENT OF WATER AND SEWERS,
BUREAU OF WATER, CHICAGO, ILLINOIS

MR. VAUGHN: Thank you, Mr. Blaser.

Mr. Chairman, conferees, ladies and gentlemen of the audience. I had a few slides -- that is, I had a few slides, but unfortunately the projector won't arrive until a little bit later. However, the conferees have the charts that have been made from the slides, so they won't have any problem, but the rest of you might not be too interested in what the slides have to show anyway.

(Mr. Vaughn's statement follows in its entirety.)

PROGRESS REPORT ON WATER QUALITY OF LAKE MICHIGAN NEAR CHICAGO

A Report of the Department of Water and Sewers, City of Chicago
by
James C. Vaughn, Engineer of Water Purification
Philip A. Reed, Filtration Engineer V

Introduction

The Chicago Department of Water and Sewers is charged with the responsibility of treating and distributing water to the City and to the suburbs, presently numbering 72, which obtain their water supply from the City. In total, 4,500,000 persons are dependent on the Chicago Water System.

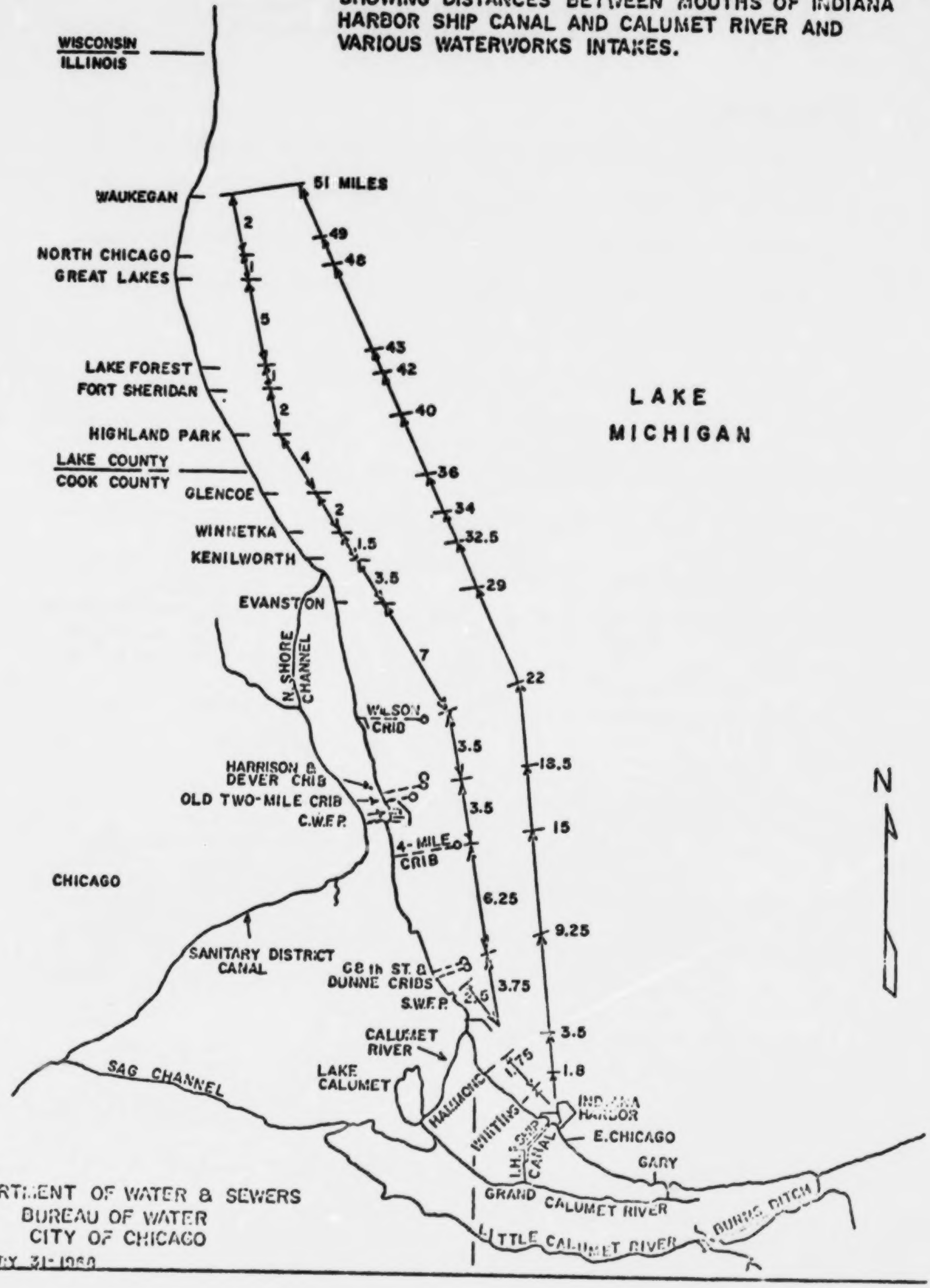
The source of supply is Lake Michigan. The City maintains intakes located several miles from the shore, using tunnels to convey water to the filtration plants for treatment. Each plant also possesses an intake as part of the plant structure, to supplement or, if necessary, to replace the supply from the intake cribs. The cribs are located in approximately 35 feet of water; thus they receive water from the layer above the thermocline. The intakes at the plants receive water from the relatively shallow waters near the shore. In general, the shore intakes are used as little as possible, since the water quality at the shore tends to be poorer than that at the cribs.

The Water Purification Division of the Bureau of Water makes numerous analyses of raw water, water in course of treatment, and water in the distribution system. It also conducts surveys of the inshore area of the Lake along the Chicago shore, and to the north and south. Figure 1 may be used for orientation to the area within which surveys are conducted.

It is necessary to emphasize that the portion of the Lake covered by the investigations of the Water Purification Division is small compared to the entire Lake, but is nonetheless of great significance.

FIGURE 1

WEST SHORE OF SOUTHERN PORTION OF LAKE MICHIGAN SHOWING DISTANCES BETWEEN MOUTHS OF INDIANA HARBOR SHIP CANAL AND CALUMET RIVER AND VARIOUS WATERWORKS INTAKES.


WISCONSIN
ILLINOIS
WAUKEGAN
51 MILES
2
49
48
NORTH CHICAGO
GREAT LAKES
1
5
43
42
LAKE FOREST
FORT SHERIDAN
1
2
40
HIGHLAND PARK
LAKE
MICHIGAN
LAKE COUNTY
COOK COUNTY
4
36
GLENCOE
2
34
WINNETKA
1.5
32.5
KENILWORTH
3.5
29
EVANSTON
N. SHORE CHANNEL
7
22
WILSON CRIB
3.5
HARRISON & DEVER CRIB
18.5
N
OLD TWO-MILE CRIB
3.5
C.W.F.P.
15
4-MILE CRIB
CHICAGO
6.25
9.25
SANITARY DISTRICT CANAL
68th ST. & DUNNE CRIBS
3.75
S.W.F.P.
2.5
CALUMET RIVER
3.5
1.75
1.8
SAG CHANNEL
LAKE CALUMET
HAMMOND
WHITING
INDIANA HARBOR
I.H. SHIP CANAL
E. CHICAGO
GARY
GRAND CALUMET RIVER
BURNS DITCH
LITTLE CALUMET RIVER

DEPARTMENT OF WATER & SEWERS
BUREAU OF WATER
CITY OF CHICAGO
JANUARY 31- 1968

Our surveys sample perhaps one cubic mile of the 1,200 cubic miles in the Lake's volume, and about 100 of the 22,400 square miles of its area. However, this small fraction of the Lake constitutes the water supply for the largest population aggregate on the Great Lakes system. Data concerning it are, therefore, of greater significance than the area or volume concerned would suggest.

We have found that data collected at the South Water Filtration Plant (SWFP) are valuable for estimating the quality of this portion of the Lake's waters, both because the period of record for this location is longer and because it is subject to greater variation in water quality than is the Central Water Filtration Plant (CWFP). The data discussed in this report come primarily from SWFP operating and test information.

Bacteriological Quality

Variations in bacteriological quality of the Lake at the intake of the SWFP are summarized below:

TABLE 1

	Coliform Organisms per 100ml	
Year	Annual Average	Maximum Day
1951	14.0	375
1952	9.7	495
1953	13.9	534
1954	20.0	959
1955	42.3	1,300
1956	38.7	1,400
1957	70.8	9,600
1958	63.1	6,400
1959	85.6	3,200
1960	65.2	2,900
1961	52.4	3,000
1962	69.5	1,700
1963	200.8	5,800
1964	110.2	1,900
1965	46.3	1,100
1966	35.6	1,200
1967	260.0	13,000
1968	82.0	2,400
1969	59.0	980
1970	20.0	670
1971	22.0	1,100

Examination of the table demonstrates several facts. Numbers of coliform organisms per 100ml, even annual averages, have been highly variable, moving irregularly from low to high values. However, with the exception of the inconsiderable increase in 1971, the trend has been distinctly downward since 1967. The unpredictable high values recorded in the past make prediction hazardous, but the consistent decline for the last few years--the only such lengthy decline in numbers in the 21-year period covered--leads to the hope that perhaps an irreducible minimum concentration has been reached.

Hydrocarbon Odors

While odors present in water may come from a variety of sources, and possess a variety of characteristics, certain ones are more significant than others. Those characterized in the twelfth edition of Standard Methods[1] as hydrocarbon, and abbreviated as Ch, are especially important in this connection. (This table has not been included in the current, thirteenth edition.) The odors so characterized are typical of certain types of industrial waste, make water wholly unsuitable for drinking unless removed, and are difficult and expensive to remove. The treatment technique used in Chicago is the addition of activated carbon which is removed after it has adsorbed the odorous compounds.

Table 2 summarizes information on occurrence of hydrocarbon odors at SWFP for 1950-1971, inclusive. Two terms used in the table may require definition. An "odor period" is any number of consecutive days on which a hydrocarbon odor is present in the water entering the plant. An "odor day" is any day on which such odors are present. Thus a period of four consecutive days when hydrocarbon odors are present would be recorded as one odor period and as four odor days.

---

[1] Standard Methods for the Examination of Water and Wastewater. Twelfth Edition, APHA: New York (1965) p. 306

TABLE 2

SUMMARY OF HYDROCARBON (Ch) ABNORMAL ODOR PERIODS IN RAW LAKE WATER SUPPLY TO SOUTH WATER FILTRATION PLANT 1950-1971

Year	Odor Periods	Total Odor Days	Maximum Threshold Odors During Periods			Maximum Activated Carbon Dosage Applied lb/mil gal
			4-20	21-50	51-100	
1950	10	36	6	3	1	1158
1951	20	127	16	4	-	446
1952	17	30	16	1	-	590
1953	16	18	16	-	-	266
1954	12	23	11	1	-	356
1955	15	36	15	-	-	279
1956	13	28	12	1	-	415
1957	18	49	18	-	-	325
1958	17	43	16	1	-	503
1959	19	40	17	2	-	712
1960	21	42	20	1	-	324
1961	23	94	23	-	-	388
1962	23	76	23	-	-	270
1963	28	72	27	1	-	680
1964	28	89	27	-	1	745
1965	15	46	14	1	-	320
1966	26	95	25	1	-	385
1967	21	89	20	1	-	557
1968	22	57	17	1	-	411
1969	15	42	13	1	-	557
1970	8	18	8	-	-	213
1971	18	26	18	-	-	214

None of the last three years has exceeded the average number of odor periods for the period (18.4 per year),although 1971 had nearly that many. Similarly, there has been a decrease in the number of odor days. All the last three years have been well below the average of 53 days per year. During the last third of the period reported, there has been a tendency for maximum odors as measured by threshold odor numbers to decrease. Maximum activated carbon dosages, which are perhaps a more sensitive measure of maximum severity of odors, have shown a similar tendency to decrease, as well.

Ammonia Nitrogen

Concentrations of ammonia nitrogen are determined in the course of routine plant operation. In surface waters its presence is often interpreted to suggest the presence of pollution by sanitary sewage. It is also present in many industrial wastes. In Chicago it is removed by treating the water entering the plants with sufficient chlorine to remove the ammonia and leave a "free" chlorine residual.

The highest concentrations are of most interest because they impose the severest demands on the plant. In Table 3, data are presented on maximum ammonia nitrogen concentrations and chlorine doses. Because high ammonia concentrations are commonly associated with severe odors, data on maximum activated carbon dosages are repeated here.

TABLE 3
SUMMARY OF MAXIMUM AMMONIA NITROGEN IN INTAKE WATER SUPPLY, AND ACTIVATED CARBON AND CHLORINE APPLIED DURING ABNORMAL ODOR POLLUTION PERIODS
SOUTH WATER FILTRATION PLANT, 1950-1971

Year	Maximum Ammonia Nitrogen (ppm)	Maximum Activated Carbon Dosage (lb/mil gal)	Maximum Chlorine Dosage (lb/mil gal)
1950	0.28	1158	84.0
1951	0.20	446	45.5
1952	0.25	590	45.1
1953	0.12	266	35.4
1954	0.15	356	20.8
1955	0.12	279	24.3
1956	0.18	415	24.4
1957	0.25	325	26.8
1958	0.68	503	19.4
1959	0.29	712	24.5
1960	0.27	324	16.0
1961	0.36	388	20.3
1962	0.59	370	27.2
1963	0.23	680	42.8
1964	0.50	745	56.1
1965	0.20	320	53.1
1966	0.26	385	53.9
1967	0.26	557	70.0
1968	0.25	411	51.1
1969	0.25	557	37.8
1970	0.14	213	39.0
1971	0.20	214	40.6

The maximum ammonia nitrogen concentration was rather low at the beginning of the period reported, tended to be higher in the late fifties and early sixties, and has fallen in the last few years to approximately the level characteristic of the start of the period.

The changes in maximum chlorine dosage are somewhat more difficult to interpret because they include the effects of changes in operating techniques in the plant, but it is fairly clear that maximum dosages for 1969, 1970, and 1971 have been lower than for the years immediately previous.

Activated Carbon

Because activated carbon use tends intrinsically to be the most expensive treatment operation used, and because the extent of its use provides a useful overall measure of water quality, more extensive data on the subject are presented in Table 4. Once again, the maximum carbon dosages are included for ease of comparison.

Of the data in Table 4, the most significant as a measure of overall water quality are the figures for the average carbon dosage in pounds applied per million gallons of water treated. Like some of the data presented earlier, these demonstrate the need for a rather high level of treatment, especially during the middle years of the sixties, and a decrease in the extent of treatment required during the last three years.

The dosage for 1971, it should be made clear, must be considered on a different basis than earlier ones. Recently installed butterfly valves at the shore intake permit rapid variations in the amounts of water taken from the two intakes; since undesirable odors are more frequent on the shore supply, the result of their use has been to reduce carbon requirements. Water entering the plant from the crib supply may now be treated with carbon in two stages; this also leads to more economical use of carbon. The combined effect of all changes is reflected in the extremely low average carbon dosage.

The total quantity of activated carbon used is a measure of water quality, but is only an approximate one, since the plant treats somewhat different amounts of water each year. These figures are valuable for defining the scale of water treatment required in Chicago. The maximum dosages illustrate the treatment capacity required to meet the most severe conditions of odor. In a sense, they represent additional investment in storage, piping, and feeding systems required to meet the peak demand for carbon.

TABLE 4

SUMMARY OF ACTIVATED CARBON APPLIED
FOR REMOVAL OF ODORS IN LAKE WATER
SOUTH WATER FILTRATION PLANT
1950- 1971

Year	Total Activated Carbon Applied (lbs)	Average Carbon Dosage (lb/mil gal)	Maximum Hourly Carbon Dosage During Odor Periods (lb/mil gal)
1950	2,874,905	26	1158
1951	3,545,552	31	446
1952	3,203,426	26	590
1953	1,775,063	14	266
1954	2,011,359	16	356
1955	2,057,781	17	279
1956	1,981,108	16	415
1957	3,032,729	24	325
1958	2,762,540	22	503
1959	3,035,509	23	712
1960	2,727,005	21	324
1961	2,632,923	21	388
1962	2,865,541	22	370
1963	3,194,443	23	680
1964	3,773,655	27	745
1965	3,094,606	23	320
1966	4,678,661	33	385
1967	4,455,273	32	557
1968	4,879,309	33	411
1969	2,542,600	18	557
1970	1,535,500	11	213
1971	782,200	9	214

Illinois State Standards - SWB-7

As one consequence of the Federal Water Quality Act of 1965, Illinois, like all other states, formulated standards for interstate as well as intrastate surface waters. The standards for Lake Michigan were stated in the Sanitary Water Board's SWB-7, and remained in effect with a few changes until they were superseded by the omnibus standard adopted by the Illinois Pollution Control Board (IPCB) on March 7, 1972. Pending federal approval of the IPCB's document, the SWB-7 standards are still effective at the federal level.

Chicago's SWFP was designated as a control point with respect to the open waters of Lake Michigan in the Water Quality Criteria formulated by a Technical Committee of the 1965 Illinois-Indiana Conference on Pollution of Lake Michigan and Its Tributaries. These criteria are virtually identical with the Lake Michigan open water standards of SWB-7. Data collection on a frequent, in most cases daily, basis was begun in 1965 at SWFP and is continuing at this time.

In Table 5 are summarized data on the extent to which sixteen water quality parameters conformed to the SWB-7 open water standards for Lake Michigan. All figures are on a per annum basis; the numerator of each fraction represents the number of times per year the parameter value exceeded the standard, while the denominator represents the total number of determinations per year made on the parameter.

Even cursory inspection of Table 5 shows that a number of parameters never exceeded the limits set in the standard (temperature, pH, MBAS, cyanides, iron, fluoride, filterable residue). A number of others exceeded the standard too seldom for the exceedances to be significant (total coliform, fecal streptococci, color, dissolved oxygen). Significance should be attached, however, to certain parameters which

TABLE 5
CONTROL POINT - OPEN WATER
SOUTH WATER FILTRATION PLANT
COMPARISON OF ACTUAL RESULTS WITH WATER QUALITY CRITERIA

PARAMETER	QUALITY CRITERIA		EXCEEDING DAILY AVERAGE		EXCEEDING SINGLE VALUE	
			1965-1970 Avg.	1971	1965-1970 Avg.	1971
Coliform Bacteria (MPN/100 ml)	Annual Average	≯ 200				
	Daily Average	≯ 2500			1/363	0/359
Fecal Streptococci (Number/100 ml)	Single Daily Value	≯ 25			7/305	3/352
True Color (Units)	Annual Average	≯ 5				
	Single Daily Value	≯ 15			0/261	0/80
Threshold Odor	Single Value	≯ 8			14/365	1/364
	Daily Average	≯ 4	27/365	3/365		
Temperature (°F)	Single Daily Value	≯ 85			0/361	0/365
pH (Units)	Annual Median-Range	8.1-8.4				
	Daily Med-Range	7.9-9.0	0/365	0/365		
Dissolved Oxygen (Percent Saturation)	Annual Average	≮ 90				
	Single Value	≮ 80			1/15	1/55
Ammonia Nitrogen (mg/1)	Annual Average	≯ 0.02				
	Daily Average	≯ 0.05	27/365	5/365		
Methylene Blue Active Subst. (mg/1)	Annual Average	≯ 0.05				
	Single Daily Value	≯ 0.20			0/107	0/161
Chlorides (mg/1)	Annual Average	≯ 9 (8)				
	Single Daily Value	≯ 15			1/310	24/349
Cyanides (mg/1)	Single Value	≯ 0.025			0/32	0/56
Fluorides (mg/1)	Annual Average	≯ 1.0				
	Single Daily Value	≯ 1.3			0/323	0/365
Dissolved Iron (mg/1)	Annual Average	≯ 0.15				
	Single Daily Value	≯ 0.30			0/297	0/365
Phenol-Like Substances (mg/1)	Annual Average	≯ 0.001				
	Single Value	≯ 0.003			50/253	41/364
Sulfates (mg/1)	Annual Average	≯ 24 (23)				
	Single Daily Value	≯ 50			4/306	20/337
Total Phosphates (mg/1)	Annual Average	≯ 0.03 (0.02)				
	Single Daily Value	≯ 0.04			164/343	224/353
Filterable Residue (mg/1)	Annual Average	≯ 165 (162)				
	Single Daily Value	≯ 200			0/164	0/250

Legend: ≯ Not more than
> More than
< Less than
≮ Not less than

$\frac{\text{Number of days exceeding criteria}}{\text{Number of days tested}}$

either exceeded the standard frequently or whose exceedances are important regardless of their frequency.

Of these parameters, the most important is total phosphate. There is strong evidence that phosphate is the nutrient whose concentration limits the total mass of biological growth in fresh waters. The limiting concentration of 0.03 mg/l was originally used in SWB-7 because that was the best available estimate, at the time of the standard's adoption, of a maximum safe concentration. That is, evidence then available indicated that 0.03 mg/l of phosphorus as orthophosphate was the highest concentration that was unlikely to cause excessive growth of algae. Later information, developed in public hearings by the IPCB, caused that body to lower the permissible maximum concentration by one third, to 0.02 mg/l as orthophosphate.

Actual concentrations of phosphate in Lake Michigan at Chicago have consistently been higher than those set by the State agencies as desirable maxima. This has been true at both plants, and both plants have demonstrated essentially identical concentrations. Furthermore, the concentration of phosphate has been increasing, as Table 6 demonstrates.

TABLE 6

QUARTERLY AVERAGE CONCENTRATIONS (mg/l) TOTAL PO_4
LAKE MICHIGAN AT SWFP RAW HEADER
1966-1971

Year & Qr.	Total PO_4 (mg/l)	Year & Qr.	Total PO_4 (mg/l)
1966-1	0.024	1969-1	0.064
-2	0.033	-2	0.063
-3	0.016	-3	0.039
-4	0.042	-4	0.049
1967-1	0.053	1970-1	0.063
-2	0.053	-2	0.072
-3	0.062	-3	0.065
-4	0.074	-4	0.072
1968-1	0.120	1971-1	0.076
-2	0.091	-2	0.061
-3	0.055	-3	0.082
-4	0.058	-4	0.086

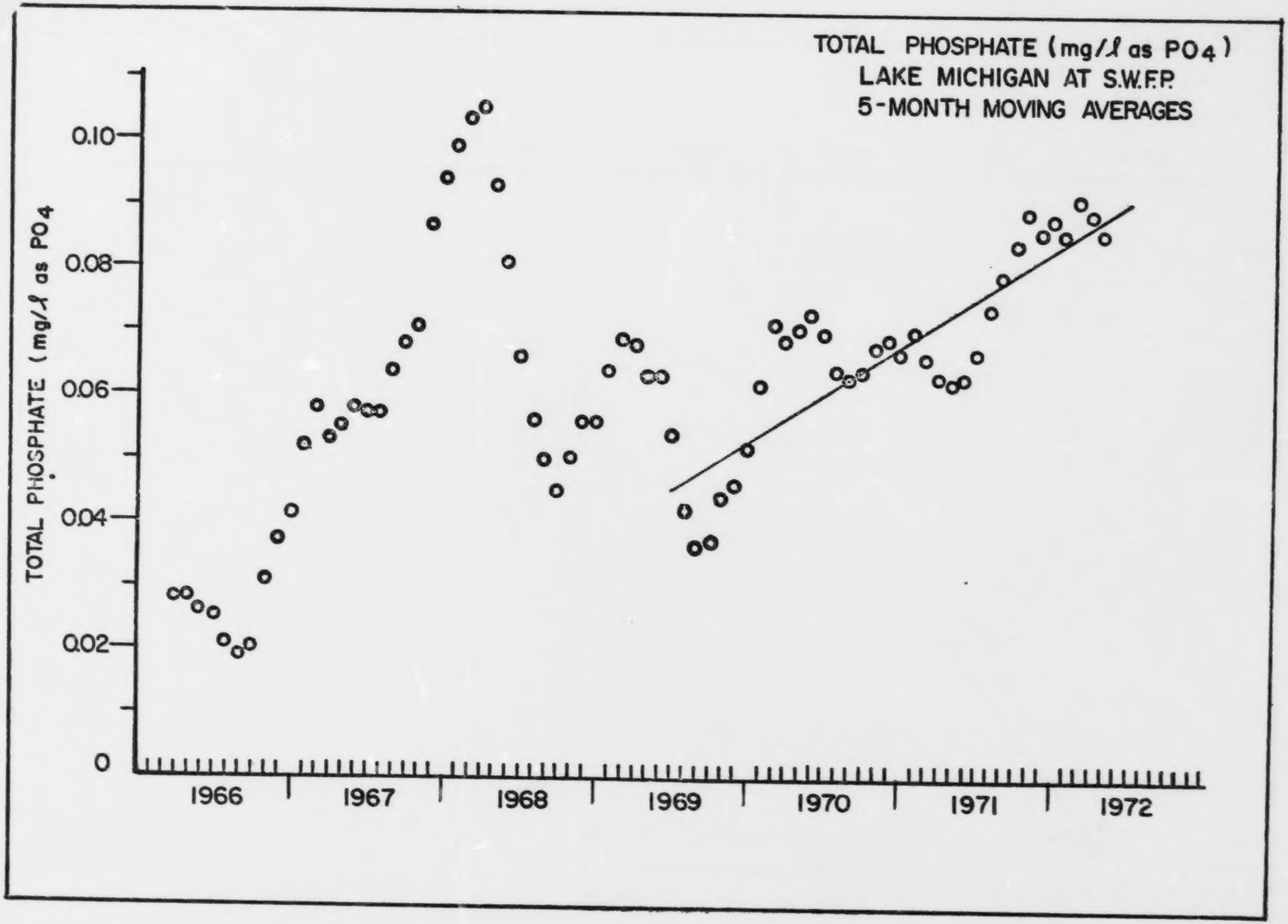
Because of the strong interest in phosphate concentration, we examined the SWFP data somewhat more closely (Fig. 2). Use of 5-month centered moving averages to reduce random variation indicated a rapid increase in total phosphate in 1966 and 1967, followed by a decrease in 1968 and 1969, and this followed in turn by a consistent increase in 1970, 1971, and the first half of 1972. A linear regression line fitted to data from July 1969 to June 1972 suggests that phosphate concentrations are now increasing at 0.015 mg/l per year, a rate sufficient to cause concern.

A group of three related parameters--sulfate, chloride, and filterable residue (total dissolved solids)--deserves some attention. These are generally regarded as being biologically conservative; that is, their concentrations are unaffected by biological activity in water. They enter the water as the result of varied human activities. Thus changes in their concentrations provide a measure of the effect of human activity on the Lake that is not complicated by participation in biological activity. The absolute concentrations of these materials in Lake Michigan are too low to be of any concern; what is of interest are the changes in concentration. These are summarized below.

TABLE 7

ANNUAL AVERAGE CONCENTRATIONS (mg/1)
CHLORIDE, SULFATE, AND FILTERABLE RESIDUE
SOUTH WATER FILTRATION PLANT RAW HEADER, 1966-1971

Year	Chloride	Sulfate	Filt. Residue
1966	7.7	24.5	158.7
1967	7.6	22.7	160.6
1968	7.3	22.8	162.5
1969	7.2	22.9	162.1
1970	7.7	23.1	165.9
1971	9.1	22.7	172.6



TOTAL PHOSPHATE (mg/l as PO4)
LAKE MICHIGAN AT S.W.F.P.
5-MONTH MOVING AVERAGES

FIG-2

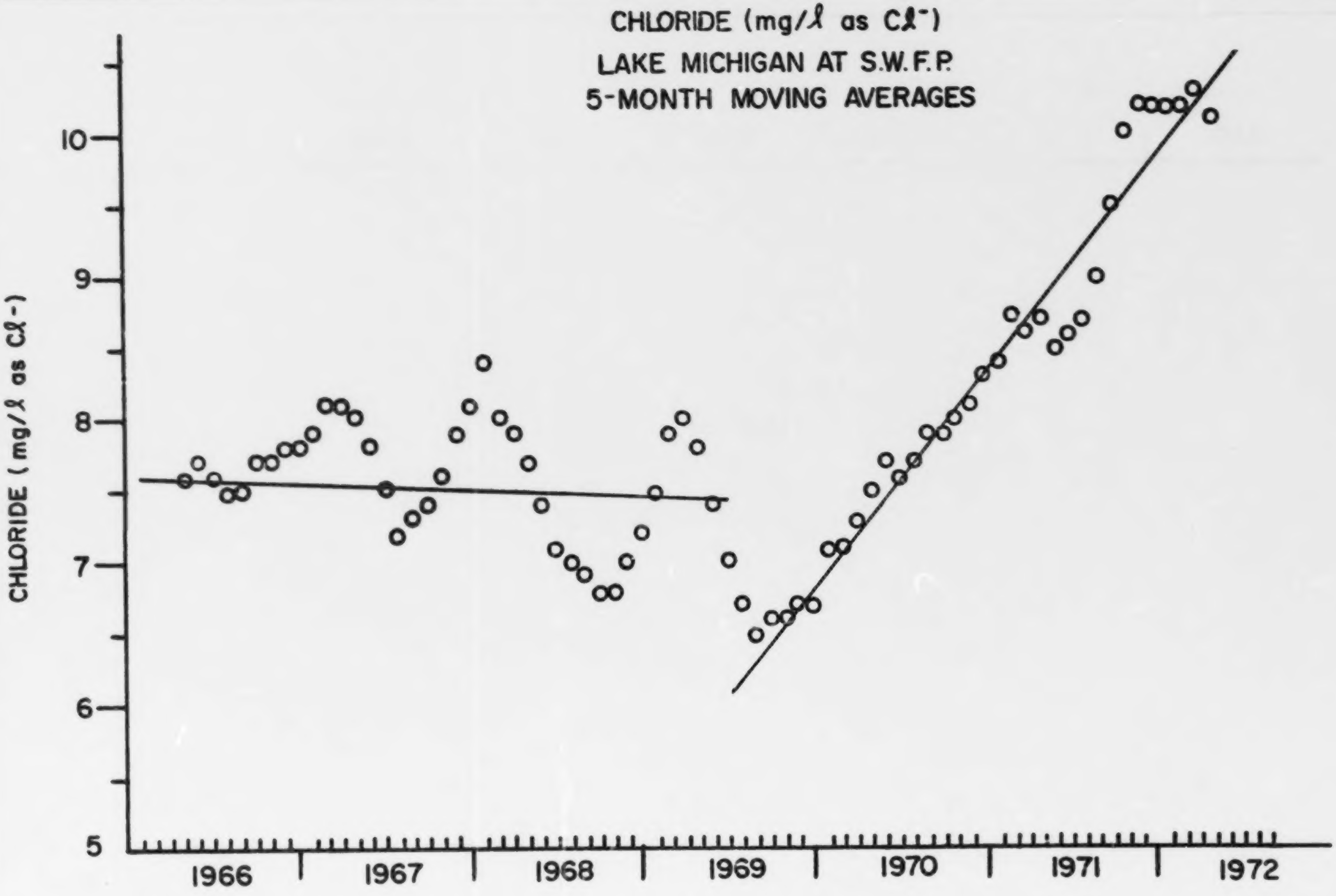

CHLORIDE (mg/ℓ as Cℓ⁻)
LAKE MICHIGAN AT S.W.F.P.
5-MONTH MOVING AVERAGES
CHLORIDE (mg/ℓ as Cℓ-)
10
9
8
7
6
5
1966
1967
1968
1969
1970
1971
1972

FIG-3

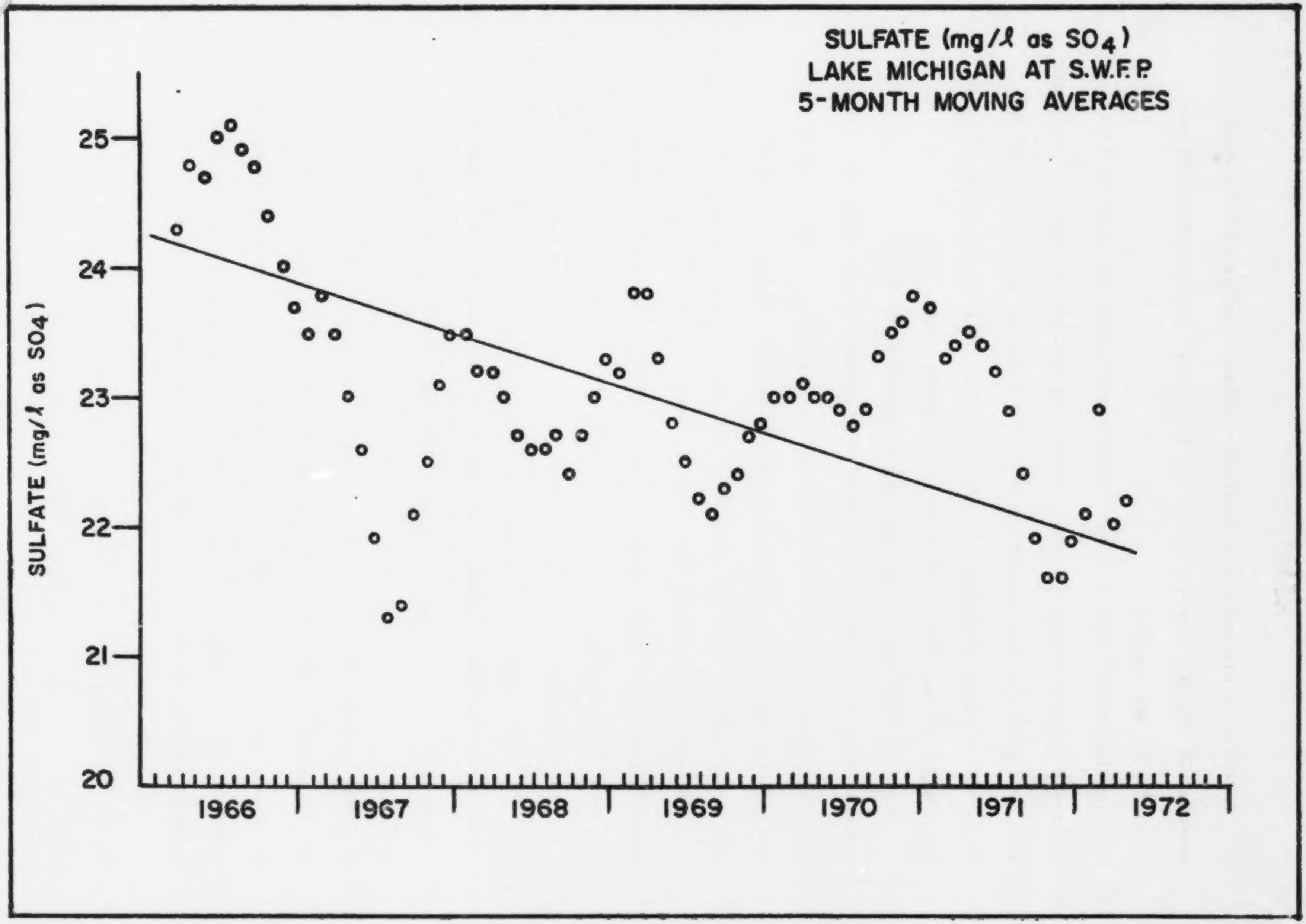

SULFATE (mg/l as SO4)
LAKE MICHIGAN AT S.W.F.P.
5-MONTH MOVING AVERAGES
SULFATE (mg/l as SO4)
25
24
23
22
21
20
1966
1967
1968
1969
1970
1971
1972

FIG.-4

Recently chlorides have definitely increased; sulfates have decreased somewhat in average concentration; but filterable residue has increased consistently and rapidly.

Examination of data on these three parameters by the same methods (centered 5-month moving averages, linear regression) as used for phosphate data confirmed the conclusions evident from Table 7, and provided better estimates of rates of change of concentration. Sampling programs covering other areas of the lake would undoubtedly modify these trends.

Until a time apparently near the beginning of 1970 (Fig. 3), chloride concentration was probably decreasing very slowly. Since that time, there has been a sharp and continuing increase in chlorides, at the rate of 1.5 mg/l per year. During this period the seasonal changes which were previously well marked have tended to disappear, as well.

Sulfate concentration (Fig. 4) has generally tended to decrease at about 0.4 mg/l per year during the entire period, although obviously the rate of concentration change has varied considerably.

Concentrations of total dissolved solids (filterable residue), (Fig. 5) have changed in a manner generally similar to phosphate and chloride. From 1966 to 1969, the rate of increase was slightly over 1.0 mg/l per year; in the last 2-1/2 years it has been nearly 5 mg/l per year.

Data for the first half of 1972 were used here, but not elsewhere in this report. The reason is that elsewhere data are considered in terms of annual average. Six consecutive months may give an average biased by seasonal effects. The values collected for January-June 1972, however, tend to support the discussion and conclusions in this report.

This sort of change suggests that relatively little of the increase in dissolved materials is likely to have come from sewage plant effluents.

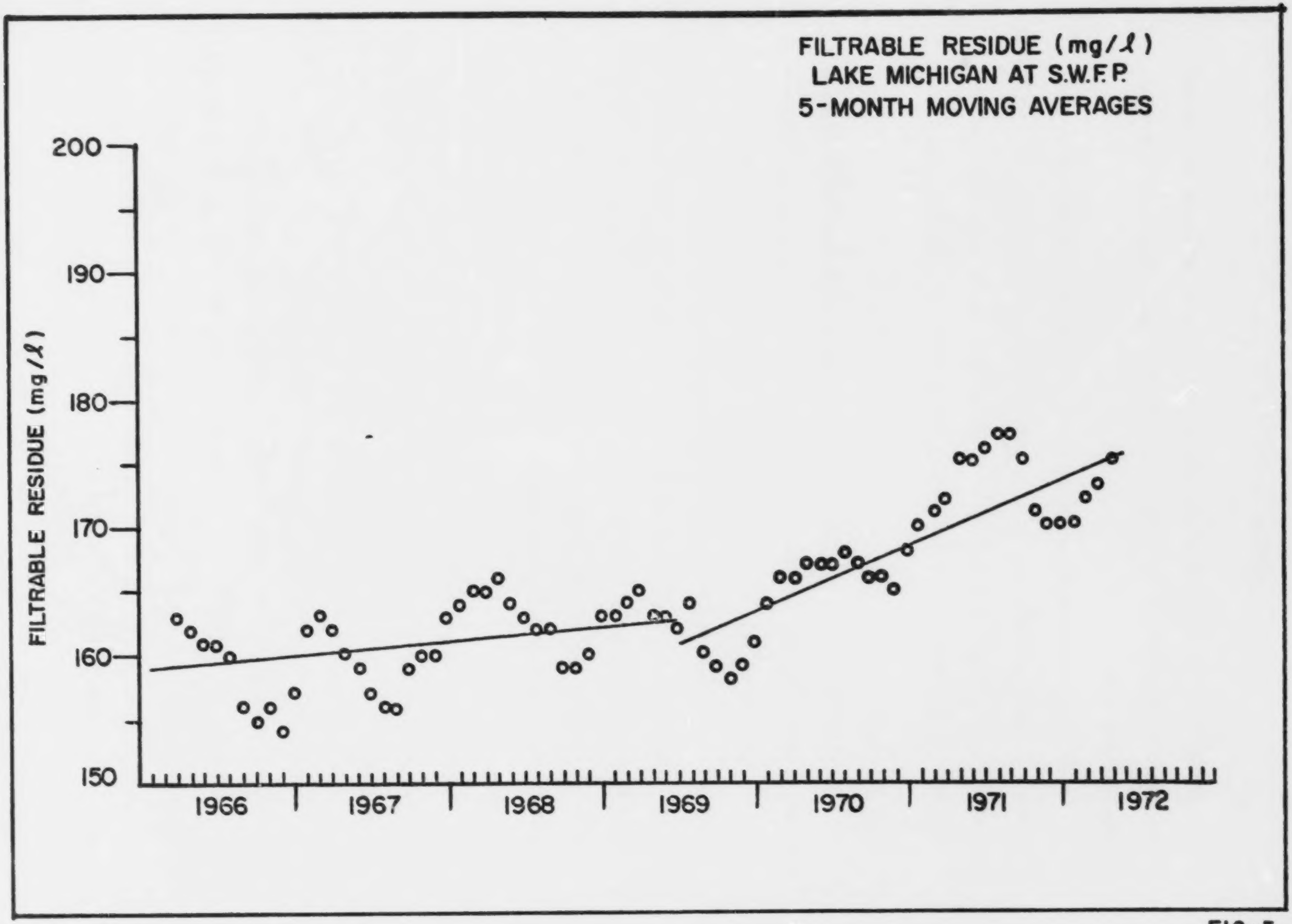

FILTRABLE RESIDUE (mg/ℓ)
LAKE MICHIGAN AT S.W.F.P.
5-MONTH MOVING AVERAGES
FILTRABLE RESIDUE (mg/ℓ)
200
190
180
170
160
150
1966
1967
1968
1969
1970
1971
1972

FIG.-5

The probable causes are industrial wastes and perhaps agricultural sources. The small numbers of coliform bacteria and of fecal streptococci reported support this view.

Phenol-like substances constitute another parameter whose occurrence depends on human activities, in this case predominantly one kind of industrial activity. One year's data are not enough to let one be sure, but the decrease in occurrence of these substances in 1971 is a hopeful sign.

IPCB Standards

On March 7, 1972, the Illinois Pollution Control Board (IPCB) adopted a set of water quality standards for all the waters of the State, including the portion of Lake Michigan lying within Illinois. Simultaneously the Board repealed regulation SWB-7. The new standards were developed on a different basis than those in SWB-7, and differ in numerous ways from them. Consequently it seemed likely that reexamination of data collected at Chicago in the light of the new standards would provide some insight into the probable significance and effects to be expected of the new standard.

To preserve comparability, only the data for Chicago's South Water Filtration Plant were examined. Data for 1966-1971, inclusive, have been used, as before.

Fecal Coliform, pH, Iron, MBAS, Cyanide

Several water quality parameters can be disposed of summarily. The IPCB standard specifies fecal coliform as the only bacteriological parameter used and specifies a geometric mean of no more than 20 per 100 ml over a 30-day period. Even using 30-day moving averages, no period in 1966-1971 would exceed this standard.

Specifications for pH are 7.0 to 9.0, much looser than those in SWB-7. Since the SWB-7 standard for pH was not exceeded, neither was the IPCB standard.

The IPCB standard for iron is essentially the SWB-7 standard. No result for 1966-1971 exceeded the standard.

The IPCB standard for methylene blue active substance is less rigid than the SWB-7 standard. No sample exceeded either standard.

The standard set by the IPCB for cyanide is 0.01 mg/1. Three scattered samples, one each in 1967, 1969, and 1971, exceeded this standard slightly. They amounted to about 1 1/2% of the samples tested. These results are not significant.

Chloride

A number of other parameters exceeded the permissible values in the IPCB standards to greater extents. None of the 1,691 tests for chloride run during 1966-1970 exceeded the 12 mg/1 maximum permitted in the IPCB standard, but 14 values scattered between February and November of 1971 exceeded this limit. During 1971, 359 tests were made, so about 4% exceeded the prescribed limit.

Dissolved Oxygen

Routine determinations of dissolved oxygen were begun in April 1969. Between that time and the end of 1971, only three of the 141 tests performed failed to meet the SWB-7 standard. However, 44, or 31%, failed to meet the IPCB standard. It will be obvious to anyone familiar with both standards that many of these failed by a small margin to meet the IPCB standard.

Ammonia Nitrogen

Ammonia nitrogen determinations were made several times each day during the six-year period and averaged daily. On comparing the daily averages to the IPCB standard of 0.02 mg/1, one obtains the following

TABLE 8

Year	No. of tests exceeding IPCB standard	No. of tests made	% of tests exceeding standard
1966	187	365	51
1967	152	365	42
1968	84	366	23
1969	76	365	21
1970	11	365	3
1971	12	365	3

Obviously the occurrence of higher ammonia nitrogen concentration decreased rather steadily for four years, and has remained stable at what is probably a minimum frequency of occurrence for the last two years.

Total Dissolved Solids

On considering the results for total dissolved solids, for which the IPCB standards set a maximum of 180 mg/1, a very different pattern emerges:

TABLE 9

Year	No. of tests exceeding IPCB standard	No. of tests made	% of tests exceeding standard
1966	3	98	3
1967	5	102	5
1968	13	253	5
1969	13	257	5
1970	30	270	11
1971	63	250	26

In the last two years, the proportion of tests exceeding the IPCB standard has been significant, and has been increasing. It is not impossible that in 1972, one half of the tests run may exceed the standard.

Sulfate

When one looks at sulfate results, another pattern emerges:

TABLE 10

Year	No. of tests exceeding IPCB standard	No. of tests made	% of tests exceeding standard
1966	187	272	69
1967	152	345	44
1968	84	358	23
1969	76	362	21
1970	11	365	3
1971	12	353	3

The results of tests for sulfate ion, coincidentally, virtually duplicate those for ammonia nitrogen, the fraction of tests exceeding the IPCB standard being nearly identical for the last five of the six years.

Phenol

Examination of determinations of phenols for the same period, in terms of the IPCB limit of 0.001 mg/l maximum permissible concentration, demonstrates still another pattern:

TABLE 11

Year	No. of tests exceeding IPCB standard	No. of tests made	% of tests exceeding standard
1966	203	272	75
1967	82	198	41
1968	58	261	22
1969	32	360	9
1970	45	354	13
1971	126	364	35

Where the other parameters examined have exhibited rather clear and consistent increases or decreases, phenols show a decrease, followed by increases for the last two years. There is no reason to expect phenols necessarily to be correlated with the parameters examined previously, so there is no inconsistency in this sort of change. Taking both standards into account it is obvious that concentrations in the range 0.001 - 0.003 mg/l became more common in 1970-1971.

Total Phosphate

When one examines results for total phosphate (max. permissible concentration 0.007 mg/l as P, or 0.02 mg/l as PO_4), a consistent and unpleasing pattern emerges:

TABLE 12

Year	No. of tests exceeding IPCB standard	No. of tests made	% of tests exceeding standard
1966	137	266	52
1967	318	337	94
1968	329	362	91
1969	288	363	79
1970	353	365	97
1971	344	353	97

Throughout the six-year period, most of the results exceeded the IPCB standard; in four of the six years, nearly all results exceeded the standard. If one assumes that the Board's judgment was correct when it set the standard--and all available evidence tends to support it--one cannot avoid the conclusion that there is little chance that the Lake will meet this standard in the near future. Phosphorus inputs into the Lake are clearly large and continuous. The temporary drop in 1969 is interesting, because it suggests that at least part of the input is controllable. Further study may provide evidence to allow identification of the sources concerned.

Lake Sampling Surveys

The Department conducts a limited number of surveys of the Lake each year. These surveys involve collection and analysis of samples from 21 locations, from Waukegan to Burns Ditch. In 1971 five such surveys were made. Average ammonia nitrogen concentrations at all points were above the 0.02 mg/1 maximum annual average concentration specified in SWB-7 and in the current IPCB standard. Eighteen of the 21 sampling points averaged greater concentrations of total phosphate than the 0.03 mg/1 maximum originally specified in SWB-7; twenty of the 21 exceeded the 0.02 mg/1 permitted by the IPCB standard. Only two locations, both near the mouth of the Indiana Harbor Ship Canal, exceeded the 200 per 100 ml total coliform standard of SWB-7; both these locations showed high counts of fecal coliform as well.

Interpretation

The comparisons with the IPCB standards lead, not surprisingly, to the same general conclusions as those based on SWB-7. One may tentatively conclude that relatively little sewage plant effluent is entering the Lake in the area of interest. Our data do not permit exact analysis or differentiation, but the principal sources of pollution appear to be industrial wastes and possibly runoff.

The spotty pattern of changes in concentration, with improvement in some respects (coliform, phenol, and ammonia nitrogen, as examples) and deterioration in others, also suggests that the most useful method of further investigation would concentrate on investigation of specific possible sources. Any other approach would probably be out of date and inappropriate.

MR. MAYO: Mr. Vaughn, thank you very much for what has been historically a series of very useful and at least for the last 2 years rather encouraging reports from the city of Chicago.

As you mentioned in the report, there are reasons for feeling encouraged and obviously reasons for concern in the material which you have presented.

The conferees are welcome, at this point, to address Mr. Vaughn's report in whatever questions they feel are appropriate.

Mr. Fetterolf.

MR. FETTEROLF: Mr. Vaughn, since 1950, at the South Water Filtration Plant, you have applied some 63 million pounds of activated carbon. What does activated carbon cost a pound?

MR. VAUGHN: Over the years the price remained constant -- $156 a ton -- which was 7.8 cents a pound. But for the last 3 years -- and we had a 3-year contract -- we paid $173 a ton, which is about 8.65 cents a pound.

MR. FETTEROLF: Well, if we said 10 cents a pound, we would come up with the fact that it cost $6 million or so for this activated carbon over the years, plus storage, piping, and feeding systems. And you used this to control the odor in the water. What is the cause of the odor in the water?

MR. VAUGHN: Well, the hydrocarbons, which are the terms we use -- the hydrocarbon wastes, of course, caused from chemical plants and refineries -- we used to call them refinery wastes -- and back with the old Technical Advisory Committee we got into a lot of arguments over that, so we dropped that term and picked up the term "chemical wastes" from refineries, to some extent, and chemical industries that manufacture organic material.

MR. FETTEROLF: Is there a characteristic descriptor of the odor which your odor testers apply to the water?

MR. VAUGHN: In general, we use the term "Ch" for hydrocarbons and chemicals. "C" stands for chemicals and "h" for hydrocarbons.

There are 25 or 30 other parameters or descriptive terms which we use for various other odors: musty; fishy; and then the one for the blue-green algae, pig sty.

MR. FETTEROLF: Yes. But apparently you are relating these odor problems to industrial wastes of some sort rather than to biological causes, such as algae or this type of bacteria.

MR. VAUGHN: We do periodically have those -- the answer to your question is yes. But we do periodically have problems with the algae. For instance, the one that some of you heard me mention before, the little Irishman, Denny O'Brien -- better known to biologists as Dinobryon -- creates a cod liver oil taste and odor which is very disagreeable. Even a count as low as 30/ml will produce that taste and odor, and we have had counts up to 10,000 to 20,000/ml and it took a lot of carbon and a lot of chlorine to get rid of that material.

MR. FETTEROLF: Have your chemists or your bacteriologists ever tried to culture actinomycetes?

MR. VAUGHN: Yes, they have done considerable work on that. A paper was presented at the recent Conference of the American Waterworks Association here in Chicago.

MR. FETTEROLF: Is this a problem in Chicago's water supply?

MR. VAUGHN: It is present, and at times it does produce an obnoxious taste and odor, but it is not very great in magnitude and it is not very persistent.

MR. FETTEROLF: And have your chemists tried to take a geosmin of the carbon filters or have they ever taken an analysis?

MR. VAUGHN: We have experimented with that but the results of our experiments haven't been very successful. We have sent some cultures to the EPA lab in Cincinnati, who provided the geosmin analysis, and we are familiar with their work and have been trying to duplicate it. We are working in that area. We are glad to be working on this area.

MR. FETTEROLF: Thank you.

MR. MAYO: Mr. Miller.

MR. MILLER: Mr. Chairman, I too would like to thank Mr. Vaughn for his report.

As you said, and as we all know, he has been making these reports -- I think even going back beyond this conference to the Calumet area conference -- and reporting on the quality of the southern end of Lake Michigan. We certainly look forward to it as one of the things that really keeps track on the progress that is being made, because I think that Chicago consistently, during the years, has run many more samples than anyone else on the quality of water in the southern end of Lake Michigan.

I have a couple of questions, Jim, that I would like to ask you that relate to it.

On the table on coliforms, you indicated a decrease, of course, and I would have to say that the data here indicates a very good quality water, but on the maximum days, have you ever tried to tie these down to storm runoff or a high rain, and this kind of thing?

MR. VAUGHN: We have tried on occasion to tie it into wind direction and velocity but with no success.

MR. MILLER: I was just curious if you might have the dates on some of these incidents -- when they occurred -- which might indicate some of these effects.

MR. VAUGHN: The wind velocity and direction fortunately in the recent days, when they have opened the lock gates to the lake -- the wind direction has been such that it took it out to the lake and not past one of our intakes.

MR. MILLER: Well, I know that one is of concern. I didn't have that particularly in mind when I asked the question. You had a comment in your paper that problems can still be the result of industrial waste or maybe runoff, and this was my question as to whether they may be from runoff.

MR. VAUGHN: We have not been able to tie it up with any particular weather condition. We don't have any particular evidence.

MR. MILLER: Then the table -- and I want to make sure that I understand -- that is Table 5 in the material -- I don't know whether I understood you correctly. Is this table made according to the SWB requirements, or does this go back to the standards that were developed by the Lake Michigan Conference?

MR. VAUGHN: Well, these are based, I believe, currently on the IPCB standards, but were over the years on the SWB-7 standards which were practically identical to the conference standards.

MR. MILLER: Well, what I wanted to get for my information at least is whether what we were comparing here in Table 5 is the same thing that we have been comparing in past reports.

MR. VAUGHN: I can't tell you. I wanted to introduce my colleague, Phil Reed, who actually wrote this paper anyway.

Phil, will you stand up and answer that?

MR. REED: Table 5 is based on SWB-7 exclusively, all of the way along.

MR. MAYO: Would you identify Mr. Reed for us?

MR. VAUGHN: Mr. Reed is Filtration Engineer V on the staff of the Water Purification Division and has been my technical assistant for the last 4 or 5 years.

MR. MAYO: Thank you.

MR. MILLER: I only have one other question. This is my curiosity. Is the sludge from the settling basins now at the South District Filter Plant going to the city of Chicago?

MR. VAUGHN: About 2 or 3 weeks ago we started pumping the sediment -- Mr. Baylis never let us call it sludge -- from the south plant to the Sanitary District, and just the past week we started pumping the sediment from the central plant. We are still more or less on an experimental basis, but we are continuously trying.

MR. MILLER: These, then, will be no longer going to the lake?

MR. VAUGHN: As of now. We are a long ways from getting the equipment in, but we hope to be recycling the wastewater in early next year.

MR. McDONALD: How much volume of sediment is going in the treatment plant now?

MR. VAUGHN: Well, my guess is something like -- well, 40 tons per day of dry solids at the central plant; 20 tons per day from the south plant. But we don't measure the volume of water. From time to time, when we have the system going, we will be able to have volume plus dry solids.

MR. MILLER: Thank you very much.

MR. MAYO: Mr. Frangos, do you have a question?

MR. FRANGOS: No, just a comment, Mr. Chairman, that I too would like to express our appreciation for the contributions that Mr. Vaughn has made to these conferences over the years. Apparently he has never been concerned about confusing us with the facts. I think his reports are indeed very helpful and, again, we thank you for the effort on the part of the city water department.

MR. VAUGHN: Thank you, gentlemen.

MR. MAYO: Mr. McDonald.

MR. McDONALD: Mr. Vaughn, in terms of your reports on increases in phosphorus and chlorides, both of which are subject to debate here later on in the conference, I think that this type of information lays out somewhat of a blueprint of the need for controls in these two areas. And I for one find this information very, very useful in terms of coming to some conclusions before the conference ends.

Do you have any additional information that you can make by way of a prognosis on these increasing levels, or information that is not in your statement?

MR. VAUGHN: No. We make these analyses from these various surveys. We find that a maximum of phosphorus results of high value are coming from, shall we say, the south end of the lake and from the north side, too, in the Waukegan area. We are getting some pretty high phosphate values off of some of the installations up there.

MR. McDONALD: You are getting a fairly equal spread both north and south?

MR. VAUGHN: No, it has its low points in between. In other words, the high points occur in the vicinity of the Indiana Harbor Ship Canal and off the Lake County, Illinois region.

MR. MAYO: As an observation on my part and the conferees, as I recalled, at the last two sessions of the conference in which I participated, at the last session as a conferee, we were most willing to express our pleasure at the fact that there were indications of improvement in water quality. I am a little dismayed that we haven't had any real expression of concern on the part of the conferees about the information in Mr. Vaughn's report. And it suggests at least for 1971 there were some readily identifiable and rather significant indications that that trend for improvement in water quality did not take place until 1971.

I think this invites -- at least invites the conferees -- that we proceed with the remainder of the program to give particular attention to the information provided by the city of Chicago as we address those issues. Because in a variety of respects it is quite evident that there are water quality issues that either need to be readdressed or perhaps addressed in a somewhat different fashion than we have been looking at them in the recent past in order to try to understand why the water quality levels reported for 1971 are significantly higher than those reported for 1969 and 1970, in a number of instances.

MR. MILLER: Mr. Chairman, I would like to comment on that. I think I do have some awareness and great concern for the increases that occurred in 1971, but I would have to say that I think I have been involved in Lake Michigan with Jim for almost 25 years, and you look at 1 year of data from Lake Michigan, and I don't think I can feel that I know for sure where I really am. And I would only cite to you that if you want to look at the data that is in the tables, that you go back to 1965 -- and this was the year before we even started on the programs -- and we had an exceptionally good year in water quality parameters in Lake Michigan.

So that while I certainly agree with you that this is something that we must focus our attention upon, I think that we have to look at it in the broad context of what is happening; and certainly the trends that have been given to us are indicative of what is happening.

Now I would certainly say that we ought to look to the critical things that are going up without a doubt, but I have some reservation in my mind whether I can take a date of 1971 and say, based upon the last 3 years, that there is increase in the trends because of the unknowns in my mind as far as what is actually happening to the water in Lake Michigan.

MR. MAYO: Well, I think your comments are quite appropriate, Mr. Miller, particularly as they relate to the information on chlorides and sulfate in the total problem of filterable residue. But I think we are invited at least to look at Mr. Vaughn's commentary with regard to phosphorus --

MR. MILLER: I agree.

MR. MAYO: -- which indicates that from 1966 to 1969 the rate of increase was slightly over 1 mg/l/year; for the last 2 and a half years, this has been at the rate of nearly 5 mg/l.

MR. MILLER: I agree with you 100 percent. I think that there are specific ones -- phosphorus, I would say; total solids; chlorides -- that we have to look at. The phenols particularly bother me, because Jim knows, and I know, that there have been tons and tons of phenols taken out of Lake Michigan over what was there in 1947. And we still run into some of the same values that we had back in 1947. So that I am only saying -- and I think we do have to look at some of the parameters -- and I certainly would agree with you 100 percent that phosphate does have to be of concern, chlorides, and total solids, without a doubt.

MR. MAYO: Are there any other comments, gentlemen?

MR. PURDY: Only to express, again, our appreciation, too, for Jim's contributions here to the data that the conferees have available to them. We wish you well in your retirement, Jim.

MR. VAUGHN: Thank you.

MR. MAYO: Thank you again, Mr. Vaughn.

MR. VAUGHN: I wish to express my appreciation to the conferees. You have all been nice to work with. I have enjoyed appearing before you, and I just wish you the best of luck in your continued efforts. Thank you.

MR. MAYO: Thank you. (Applause)

Mr. Blaser.

MR. BLASER: The end purpose of the enforcement conference is, of course, to end up with better quality water in the lake. The perspective that Jim has given us today, and I think in other days, has been a major contribution and it helps to have solid facts on which to base our decision.

This concludes the Illinois portion of this segment of the agenda. There are some comments from members of the public who will be picked up when we get to the public section.

MR. MAYO: Mr. McDonald.

MR. McDONALD: Mr. Blaser, on your Status of Compliance report, during the break earlier today, at least two people asked me -- and maybe they should ask you also -- why Republic Steel is not on the conference list. And if I recall, this had been debated some years ago whether to include them or not.

But could you, on behalf of the State, or one of your representatives, answer why it is not on the list?

MR. BLASER: Actually the question not only applies to Republic, but to Wisconsin Steel Division of International Harvester, and the Allied Chemical plant, essentially because they discharge not into Lake Michigan but into the Calumet River.

Now, those of you who are familiar with the geography here -- the Calumet River, which at one time flowed into Lake Michigan, has been reversed, and with rare exception flows down the Illinois River system.

I realize it is a marginal question: Is that part of the lake or not? But the conclusion is that practically all of the time it is part of the Illinois River system and it is only under rare exceptions where for one reason or another the locks are closed, that there is a reversal and that is a temporary matter, generally being a matter of hours.

MR. McDONALD: I think that is important to clarify for the record, because on the basis of the questioning to me there seemed to be some misunderstanding of some intent by Illinois to eliminate these from conference jurisdiction. I don't think your answer is indicative of that.

MR. MAYO: Are there any questions of Mr. Blaser or any comments with respect to the Illinois presentation?

MR. PURDY: None.

MR. MAYO: If not, gentlemen, it is almost 1:00 o'clock. It is time to recess for lunch.

MR. FRANGOS: Mr. Chairman.

MR. MAYO: Excuse me.

MR. FRANGOS: I just need some clarification on how we are going to proceed here. Do you want just the official statements of the State and then we will come back and hit either public officials or members of the public?

MR. MAYO: No. As I indicated a little earlier, Mr. Frangos, each State is presented with the opportunity to manage its own time. With respect to the public statements, I think to the extent that their statements are reasonably specific for the State involved, that they ought to be made a part of the package of the State's presentation. But if there are public statements that are inclusive of the States generally, or Lake Michigan generally, then I think those statements ought to come at the conclusion of all the State presentations.

MR. FRANGOS: Thank you.

MR. MAYO: With that, we will recess for lunch and begin again at 2:00 p.m.

We expect to have people in the room so, at least for the conferees, if you want to leave your materials here on the table, please feel free to do so.

(Noon recess.)

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TUESDAY AFTERNOON SESSION

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MR. MAYO: Ladies and gentlemen, if we may have your attention, please.

I understand the conferee from Wisconsin is on his way. That being the case, I think it is appropriate that, in order to keep the session moving, we go back into session and continue with the State presentations under the portion of the agenda dealing with Status of Compliance.

According to the agenda, the State of Indiana is next.

May we have your attention, please? It is a good deal too noisy. Thank you.

MR. MILLER: I would like to ask Oral Hert to present the Status of Compliance for the State of Indiana.

STATEMENT OF ORAL H. HERT, DIRECTOR,
DIVISION OF WATER POLLUTION CONTROL,
INDIANA STATE BOARD OF HEALTH,
INDIANAPOLIS, INDIANA

MR. HERT: Mr. Chairman, conferees. I would like to present the report in order of phosphorus removal and then some of the other activities.

MR. MAYO: Excuse me, Mr. Hert. Is there some material that has been passed out?

MR. HERT: Yes, I had it passed out this morning -- copies of our report -- at least to all of the conferees, and there are some copies available at the registration desk.

MR. MAYO: Thank you for waiting, Mr. Hert. Would you continue?

MR. HERT: All right. The report on phosphorus removal -- we have four communities that have completed: Elkhart, Kendallville, Ligonier, and Portage. South Bend, Nappanee, Lagrange and Valparaiso have projects under construction which include phosphorus removal facilities. Angola, Gary and Goshen have projects approved which include phosphorus removal. These projects are approved for construction grant funds which are available for 1972 Fiscal Year, and it is anticipated that construction will be under way within the next few months. Final plans and specifications for phosphorus removal facilities have been approved for Chesterton, East Chicago, Michigan City and Mishawaka.

All of the communities except Hobart and Mishawaka have thus made a commitment toward phosphorus removal. Both Mishawaka and Hobart are under orders of the Stream Pollution Control Board and those orders have now been referred to the Attorney General for enforcement under the law.

Every effort is being made to follow through on these projects. It should be noted that processing of interim water quality management plans and construction grant applications has materially slowed down municipal sewage works projects.

In addition to the projects which included phosphorus removal, the city of East Gary has completed its connection to Gary; Middlebury, Wakarusa and Wolcottville have completed sewage works projects; and Hammond and Topeka have sewage works projects under construction, which includes plant improvements as well as correction of the stormwater overflow problems into Lake Michigan.

Michigan City has continued to make substantial progress towards separation of combined sewers in major areas of the city, and Mishawaka and South Bend have provided combined sewer separation in some areas. East Chicago has completed a demonstration project to provide control of pollution from combined sewers serving approximately one-third of the city; however, a study and evaluation of this project has not been completed. East Chicago has also completed construction of separate storm sewers for a portion of its drainage area and the Gary Sanitary District has submitted a master plan for sewer improvements, which includes control of combined sewer overflows. The supplement to

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the report contains a schedule which establishes dates for provision of facilities to abate pollution from combined sewer overflows. It should be noted that compliance with this schedule will depend on the availability of Federal and State financing.

An order issued to the city of Hammond provided for control of combined sewer overflows and disinfection of stormwater discharges to Lake Michigan with the project to be completed by December 31, 1970. They did not get the project under way in time to comply with the order. However the disinfection control of the stormwater overflow is well under way now and should be completed prior to the next rainy season.

Construction is well under way on plant expansion and control of combined sewer overflow. This construction, incidentally, was under way prior to the filing of the 180-day notice.

The city of Whiting is under order from our Stream Pollution Control Board to provide disinfection and control of its discharges to Lake Michigan. It did not comply with the order, and that order has been referred to our Attorney General for enforcement. The city has submitted plans for a new sewage treatment plant to treat all of the flow from the existing combined sewers, including that flow now discharging to Hammond with the effluent discharge proposed to the Lake George Branch of the Indiana Harbor Canal and thence to Lake Michigan.

Whiting has, for some 20 years, discharged its sewage to Hammond for treatment, and we have proposed the construction of a separate plant for Whiting for discharge to the Lake George Branch. However, since they have had problems in getting together on rates with Hammond, our Board has approved the plans for a separate wastewater treatment plant.

As mentioned earlier, the Environmental Protection Agency filed a 180-day notice against Whiting relative to the discharge, and EPA has not yet made a commitment as to whether or not it would approve a sewage treatment plant for Whiting with discharge of effluent to a tributary of Lake Michigan.

The summation of grant funds -- we have on file now applications from 13 communities in the Lake Michigan Tributary Basin requesting over $8 million in Federal and $4 million in State funds to help finance construction of the projects, estimated to cost approximately $22 million.

Projects now under construction, or recently completed, total about $26.9 million with about $13 million Federal and about $6 million in State grant funds.

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On the basis of plans that have now been submitted and those under way, it is indicated that, if adequate State and Federal funds are available, practically all of the Indiana municipalities in the Lake Michigan Tributary Basin would have projects for phosphorus removal facilities either completed or under construction by the middle of 1973. The status of municipal wastewater treatment facilities is shown in the attached table with a separate sheet showing the status of the phosphate removal facilities for each community.

Surveillance of wastewater treatment plant operations and the requirement for submission of monthly reports has continued, and we believe this has improved the operation and maintenance of these facilities. However, the control of pollution from combined sewer overflows and storm sewer discharges is required to meet the water quality standards during wet weather periods. Emphasis has been continued on the requirement for semi-public installations to connect to area-wide sewerage facilities where practicable and for improved operation and maintenance of existing plants.

In the industrial waste treatment and control, Cities Service Oil Company, East Chicago, completed biological treatment facilities during July 1971, and material improvements have been made in their effluents. We had a recent announcement that the East Chicago refinery would be closed permanently on January 1, 1973.

Mobil Oil Corporation, East Chicago, has reduced its wastewater flow from approximately 2.5 mgd in 1968 to about 0.5 mgd this year; and as of September 5, 1972, they are now discharging all of their wastewaters to the Chicago Sanitary District for treatment, thus removing another outfall source of the Indiana Harbor Canal.

Advanced waste treatment facilities have also been completed by American Oil Company in Whiting; Atlantic Richfield Company, East Chicago; and they are working effectively. Inplant controls are being intensified at American Oil Company and Cities Service Oil Company to eliminate peak loads that causes upsets. American Maize Products Company, Hammond, has completed inplant equipment changes that will bring its effluent within recommended guidelines for discharge into Lake Michigan.

Evaluation of waste treatment facilities completed during 1969 and 1970 at Inland Steel Company, Youngstown Sheet and Tube Company, and U.S. Steel Corporation, showed that additional pollution control measures were needed.

An enforcement hearing was scheduled with U.S. Steel Corporation and an order issued on December 1, 1970,

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outlining completion of additional treatment facilities by December 31 of 1972. The corporation filed for judicial review of our order in Lake Superior Court, and the Board's order was set aside. The court decision has been appealed to the Indiana Supreme Court and decision on that matter is still pending.

The U.S. Steel Corporation has completed oil and solids separation facilities on the sheet and tin mill discharge and added chemical treatment to the blast furnace flue dust treatment facilities to improve that treatment; however, additional treatment is needed. The State is presently working with the U.S. Environmental Protection Agency and the Justice Department to develop requirements for U.S. Steel Corporation.

Inland Steel Company has continued to make inplant production modifications and treatment plant improvements. It has eliminated the last discharge to Lake Michigan by recycling. Additional reductions are needed in the effluent from the terminal treatment plant, coke plants, and basic oxygen process and several of the older rolling mills. The Board is presently establishing time schedules for the additional treatment needed to meet the water quality standards outlined by Regulation SPC 7R. Those dates were adopted at our Board meeting yesterday. We will proceed with notice to the industries to follow.

Youngstown Sheet and Tube Company, East Chicago, has upgraded facilities at the central water treatment plant to prevent plant upset by slug discharges, completed additional flow controls to insure maximum recycle of blast furnace gas washer water, and made internal changes in the coke plant to insure that these wastes are discharged to the East Chicago sewerage system. Additional pollution control work is needed in the areas of pickle liquor disposal, the coke plant, and the rolling mill area. As I mentioned earlier, we have established dates for completion of these additional facilities.

I show on Table 2, attached to the report, a comparison of effluent data that is available for industrial discharges in the Indiana Harbor area, and also discharges to Lake Michigan adjacent to the Indiana Harbor. All of the values aren't available for 60 days so we didn't have comparable figures for all of the values.

However, on the basis of the data that was available, it is indicated that from 1968 through 1971, oil has been reduced by 52 percent; phenols by 76 percent; BOD by 64 percent; and suspended solids by 31 percent, during this period.

Mention was made earlier today of E. I. du Pont as being one of the facilities that was not in compliance. It should be noted that during mid-1970, our Board advised E. I. du Pont that additional waste treatment was needed to reduce the levels of suspended solids, pickle liquor, zinc, and sulfates in its effluents by December 31, 1972. We were working with the staff of du Pont and they have submitted a proposal to our Board in the fall of 1970 to proceed with the necessary work. However, the Justice Department in February 1971 filed a civil action under the 1899 Refuse Act, and progress towards installation of the needed facilities has been stymied to date.

Additional proposals have been submitted. However, the problem has not been resolved because of not being able until recently to specify what effluent limitations are desired, and whether deep well disposal would be a satisfactory solution for disposal of some of their effluents.

It remains to be determined what can be done to reduce effluent characteristics to the desired level with the treatment methods available to discharge to the Grand Calumet River.

Investigations and results of samples show that Simmons Company, Munster, requires additional wastewater treatment for cyanide, oil, suspended solids, and chromium. A time schedule has been established recommending final plans by March 1, 1973, and completion of construction by June 1,

1974. This company has had inadequate treatment in the past, however some of their reduction change has caused these additional problems.

Also our Board has had an enforcement hearing with Maynard Metals Company of Schererville concerning discharge to the tributary of the Calumet River which goes west into Illinois. An order was issued on April 11, 1972, outlining necessity for completing the facility by December 31, 1972. The company has since eliminated those discharges.

Further, in the matter of compliance in the St. Joe River Basin, which is tributary to Lake Michigan, Middlebury Cooperative Creamery, Middlebury; American Motors Corporation, South Bend; and the Pennsylvania-New York Central Transportation Company at Elkhart, have completed construction of wastewater treatment facilities and are discharging effluent into the municipal sewerage systems. Gentner Packing Company of South Bend completed its facilities in late 1971. The Weatherhead Corporation at Angola completed facilities in mid-1972 and has additional facilities under construction at its Syracuse plant which should be finished prior to December 31, 1972.

A recent report on chloride discharges for industries discharging in excess of 10,000 pounds per day indicated that four steel mills and two refineries were discharging a total of approximately 260,000 pounds of chlorides per day.

Northern Indiana Public Service Company has a cooling tower under construction to provide cooling of condenser water from the existing steam electric generating plant and an additional generating plant that is under construction at Michigan City. It also plans to provide cooling facilities for the existing steam electric and proposed nuclear plant at Bailly. Other Indiana electric generating plants are conducting studies to determine if thermal control requirements can be met by changes in intake and discharge structures.

A list is appended to our report showing the status of each individual industry.

Since the last convening of the Lake Michigan Conference our Board has adopted revised regulations of Lake Michigan and contiguous harbor areas for the Grand Calumet River and the Indiana Harbor Canal, and regulations which control the discharge of pollutants in salmonid migration areas and rearing and imprinting areas.

These regulations of the Board became effective February 11, 1972, and have been submitted to EPA for consideration of adoption as Federal-State standards but have not been adopted to date.

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A review of the water quality data for Indiana tributary streams indicates a significant improvement for most parameters in the period of 1968 to 1971.

Indiana Harbor Canal showed very general improvement on an annual basis of dissolved oxygen criteria, and met criteria on 60 percent of the samples in 1971. Cyanide shows a downward trend of meeting criteria on 70 percent of the samples in 1971 as opposed to 44 percent in 1968.

Phenols on an annual average also shows a downward trend. The criteria met on 55 percent of the samples in 1971 as opposed to only 7 percent in 1968 and 1969.

Oil average values are generally steady except for some high values in 1970, 74 percent of the samples meeting the criteria in 1971.

Ammonia-nitrogen -- no trend is apparent on the mean values, but it appears to be a little higher in 1971. Hardly any of the samples meet the criteria in the 4-year period.

We have some analyses of samplings on heavy metals which I won't go into in detail, but they are a part of our report.

Fecal coliform shows, with the exception of 1971 when we had a few high values, we are generally meeting the criteria on about half of the samples.

Phosphorus shows an average concentration of more than twice the 1969 concentration.

Similar data is available in the report for Burns Ditch and Trail Creek, and I won't go into detail on that at this time although it is included in the report, as is the data on the Grand Calumet River, which discharges west to Illinois.

The summary data of the samples collected weekly from Lake Michigan beaches in Indiana also reflects improvement in water quality from the fecal coliform analysis. In the past 2 years, 1971 and 1972, only the Whiting Beach has consistently failed to meet the criteria. Approximately one-third of the Hammond Beach samples have likewise failed to meet the criteria.

The results of the pesticide monitoring from stations in Indiana Harbor, Burns Ditch, Trail Creek and the St. Joseph River showed very low values.

Analysis of samples of water supply intakes at Hammond, Whiting, East Chicago, Gary, and Michigan City generally show a positive improvement for most parameters over the past 3 years. The averages for 1971 indicate cyanide of less than 0.05 mg/l; phenols of 0.001 mg/l; oils ranging from 3.5 to 5.0 mg/l; and ammonia-nitrogen, 0.1 mg/l; and mercury of 0.0008 to 0.0012 mg/l.

The results of these Lake Michigan beach samples are also appended as part of the data.

With respect to control of pollution from combined sewer overflows, our Board at its meeting yesterday adopted dates for compliance with this requirement, including interim date for submission of reports, final plans, start of construction and completion. For the smaller municipalities, the completion date being listed as December 31, 1976; for the communities of East Chicago, Elkhart, Hammond, Mishawaka, and South Bend, the completion date is December 31, 1977; for Gary, which is under order of our Board, final plans by July 31, 1974, and completion by December 31, 1977; and for Whiting, which is not in compliance with our Board orders, as I mentioned earlier, we have referred that matter to the Attorney General for enforcement.

I believe that summarizes the report from Indiana.

MR. MAYO: Are there any comments or questions, gentlemen?

Mr. Bryson.

MR. BRYSON: If you turn to page 22, Mr. Hert, on the total combined sewer question, can you elaborate somewhat on the types of methods the various communities will be using? Are they talking separation? Are they talking regulator devices? Or has the Board provided direction to the communities on the matter?

MR. HERT: The Board has not provided direction as to which way they should go. The case of Michigan City is probably the furthest along of any of our cities and they are going the separation route. They have the major trunk line for stormwater separation installed through most of the city and they will then proceed to install laterals to provide a separate stormwater system. It has been indicated by the studies to date that most of the other cities will proceed with control of pollution from existing combined sewer overflows rather than going for complete separation.

MR. BRYSON: When you were reading through your statement, on page 2, you mentioned that the programs were contingent upon the receipt of Federal funds. Was this a Board action that entered that contingency, that you have added to the orders, or is this what the communities have transmitted to the Board?

MR. HERT: This is not a Board action. Our Board has taken the position on all of its orders that the problem of financing is not a matter of issue relative to whether or not there is pollution. But I think it is a matter-of-fact problem of being able to get a community to proceed even under court order, if some adjacent communities have received such grant funds and it appears that another community is going to be asked to proceed without those grant funds. So it is not a Board policy, but it is just a matter of fact.

MR. BRYSON: When you made your comment, though, that progress on the schedule was contingent upon the receipt of Federal money, what were you addressing — that this is the feeling the communities have transmitted to you that led you to make that comment or -- what I am trying to get is the reason for the comment.

MR. HERT: It is the feeling that has been transmitted to us by the communities, and it is such a tremendous problem beyond the scope of their financing capability, and we do have several sanitary districts in this area that are limited on their bond issues by the assessed valuation. So that when you go into a sizable project, such as the reports indicate are needed to control the pollution from combined sewer overflows, it is going to take some outside help.

MR. MILLER: I might say it another way, Mr. Bryson, that we find that projects going under construction are only those projects for which there is Federal and State funding. So that you are faced in reality with looking at it from a practical point of view that this is the way in which you are going to build. A few years back we did have some projects that went under construction with total load of financing. But this becomes less and less of a factor. And there are not many being built at this point in time that we can see that are not federally funded, except for the interim phosphorus removal facilities that are being put in.

MR. McDONALD: I would like to follow up on that question, Mr. Bryson, a little also.

The Board orders that you have issued don't call for any contingencies in the form of State or Federal funds. When it gets to a point where you have to do something because the community hasn't gone forward with construction -- in other words, you are not going to press that case if it doesn't have State or Federal funding.

MR. MILLER: That is not what we have said.

I think Mr. Hert did say that it was the policy of the Board to proceed regardless of whether there were State and Federal funds available, and we have so referred the cases to the Attorney General in court; some have been resolved by agreed orders; and we have one that the court is holding and requiring 60-day reports on financing. So that, as far as the intent of the Board and the staff in Indiana, it would be to prosecute the matters with utmost dispatch. But I think from a practical point of view, we find that plants are not built without Federal funding.

MR. McDONALD: Let me ask further, then, Mr. Miller: Has there been any case in Indiana where you have gone into the courts and the courts have said this community does not have to go forward until it gets State or Federal financing?

MR. MILLER: I don't know that we have had any direct decisions. The only one that comes close would be Cedarville, which is being held on a -- I might say -- 60-day basis to determine financing. But there has been no direct decision yet that would say that a city would not have to proceed without Federal funding.

MR. McDONALD: But it hasn't really been tested as far as a decision.

MR. MILLER: You can say it is in the process of testing, but the final results of the testing are not known at this time. There are cases there, and I think these cases will test it, yes.

MR. McDONALD: Well, you know, I think this particular question of State and Federal funding and going forward is one that is a very, very difficult question for all of the States and for the Federal Government. At the same time, in my discussions with the States, I have found practically no decisions in the courts that have supported a delay because of lack of State or Federal funding of any recent vintage certainly, and I get the feeling that this really doesn't want to be pressed. Is that essentially the attitude of Indiana?

MR. MILLER: No, I don't think this. I think we are pressing, but I think that from my point of view and from what I can visualize, until we do have some court decisions, that this is pretty much the attitude of the municipalities not building until they do have the funds. And it is going to take a lot of court actions, a lot of enforcement, and we are certainly going to have to have the judges agree that this is the way to go. And if we get one or two that say they don't have to build until they have Federal funds, why then I think you will really be tied up.

MR. McDONALD: But, at the same time, you have indicated that no one has built anyway without Federal funds.

MR. MILLER: Well, I think this is generally true.

MR. McDONALD: Well, I think it is true. I think it is generally true throughout the Nation, that there has been practically no building in this country without Federal funds.

MR. MILLER: Well, I think if you want to come to this, that this is one of the things that you come to when you have plant programs, and if a municipality builds a plant with a 25- or a 20-cent dollar, why should it spend the full amount if they can get these kinds of funds.

MR. McDONALD: I understand the municipalities' standpoint; there is no question on that. They are not going to jump up and volunteer to go forward with 100 cents when they could go for 20.

My summation on this would be, though, that there isn't going to be vigorous enforcement without the State or Federal funds that go with it, from what you have said.

MR. HERT: Would you restate that? I am not sure I heard that.

MR. MILLER: There may be vigorous enforcement, but I think, as a way of life, if you want to call it this, that you are not really going to build them. So I think I am agreeing with you, Jim, in using different words, and that if we have grant programs that are in the magnitude that they are now from 75 to 80 percent, that we are just not going to see them built unless we do have the State and Federal funding.

MR. McDONALD: Well, that is exactly what I am trying to get out here. I think that the question of lots of slippage in this Lake Michigan Enforcement Conference Basin is not unique among enforcement conferences. That is, because the money has not been there, the communities are not anxious to go forward. Yet I think the regulatory agencies -- and I think this includes the Federal regulatory agency as well as the State regulatory agencies -- have never really pushed as much as they could to really try it out to see if the communities would be ordered to go forward by the courts. And I think maybe some of that action is indicated on the State level, too.

MR. MILLER: Of course, I think there has been some of that action on the State level and I think you now have some of that action on the Federal level as well. Some of your 180-day notices have been pointed this way that you have had in Indiana.

MR. McDONALD: Very much so, yes.

MR. MILLER: So that I think that the ones that have been resolved have been tied to Federal financing programs to a certain degree, and the ones that have not been resolved have not been resolved because they couldn't be tied to the Federal funding. So that you and the State of Indiana are both in the process of finding out whether the courts are going to make a decision that says cities are going to proceed without financing.

MR. McDONALD: I feel maybe we ought to do this at both levels, and if that is the situation, then maybe we just ought to take cognizance of what some of the slippage is all about.

I don't think this is an issue that the conference has really addressed itself to in the past, because the slippage has not been that great. Now it is. And what do you do?

MR. PURDY: Mr. Chairman, Mr. McDonald's remarks seem to be addressed to the States as a whole and not in particular to Indiana.

MR. McDONALD: They are, yes.

MR. PURDY: And, as Mr. Miller has pointed out, they are in the process of testing this in the courts in Indiana, and that the decisions are not fully in, at this point in time.

On behalf of Michigan, I would like to point out that they are also testing this in Michigan courts. I think prior to this conference we have furnished some of this information to Mr. McDonald. In some cases we do have the decisions in, and the judge has ordered that the final plans and specifications be prepared, and that the community be on a ready-to-go basis at such time as financing can be arranged. He keeps the case under his continuing jurisdiction, and by so doing the financing arrangements means when the State will come through with an offer of a State and Federal grant.

MR. McDONALD: I think that was in a local court and stopped there.

MR. PURDY: Well, probably it was at the circuit court level. It is an extremely frustrating experience from the standpoint of a regulatory agency attempting to enforce pollution control requirements that are not necessarily based upon a grant being available. But yet, as Mr. Hert and Mr. Miller pointed out, that back in the days of the 30 or the 33 percent grant, it was possible to get a community to go forward without a construction grant. But in the days of an 80 percent grant, and for a time increase pending discussions of up to a 90 percent grant, it has been a very frustrating experience to attempt to get somebody to go ahead with entirely local funds no matter how much they might profess to being in support of a clean water program.

Furthermore, at the present time, with the uncertainty of what a construction grant program might be, and the fact the States have not been able to put their house in order on a State financing program which might prefinance the Federal share, if Federal funds were available, because of the uncertainties of future reimbursement, we all share, I think, a common frustrating problem here until something is straightened out in this construction grant program.

MR. McDONALD: Yes. And I agree completely as to the complexity and the frustration of the problem. I am laying, really, this foundation for this reason. One of the topics on the agenda -- and one that Mr. Blaser has already alluded to -- is that they are going to need money to solve the combined sewer problem in Illinois. Mr. Hert has said it is going to take money to solve the combined sewer problem in Indiana. I know it is in Michigan and Wisconsin also. And 5 years from now the combined sewer problem, a massive problem, as expensive as any problem we have in pollution control, is scheduled for solution by way of having control of combined sewers. If we are going to head down that same path that we find ourselves on today without recognizing whether these cleanup programs really are so tied to funds that we are not going to move without the funds, I think we are going to head down the same frustrating path again.

MR. PURDY: While we are considering this, I think we have to keep in mind the priorities, and what the magnitude of that problem might be, say, on an annual basis, or any other way that you want to look at it. But if this represents, say, 5 or 10 percent of the total contribution of a pollutant to Lake Michigan, as compared to dry weather flows, and we are frustrated by a lack of construction grant money, we had better put those dollars where we get the most return in pollution control rather than looking, say, at a combined sewer overflow problem, if this is, in fact, only 5 or 10 percent of the total problem.

MR. BLASER: First of all, Illinois has done what you indicate should be done. Illinois has made enforcement cases where the central issue has been: Does lack of State or Federal grants excuse a municipality from noncompliance? Probably the most noteworthy case is the EPA case versus the city of Mattoon. David Currie here wrote a perhaps somewhat colorfully worded decision -- I probably should use the word "opinion" -- in which he very clearly raised the question and spoke to the fact that demands for law and order apply to municipal officials as well as to the public.

This case was so well worded, so clearly to this point, that at the Municipal League Convention for the entire State just about a year ago, I made that the central issue of my speech to them -- to the mayors and municipal officials.

What was the result? What was the result? Basically a rebellion, because municipal officials here in Illinois feel very strongly that by their actions -- actions speak louder than words -- that the lack of Federal or State grants excuses them from construction.

Now what are we to do about this? I not only spoke to this, we made mailings of the Mattoon case, distributed them, and every time I talked to municipal officials there was a rebellion -- those of you who live in Illinois have followed some of it in the newspaper media -- a rebellion because municipal officials are not moving.

It sounds awfully easy to bring an enforcement case against them and make them move. But in practice, with over a thousand municipalities -- we have applications right now for 634 -- we cannot bring an enforcement case against each of them.

Further, the Municipal League has in front of it right now a resolution in which they make the very point -- and they focus more on combined sewer overflows than anything else, but the principle of raw sewage -- that if the funding is not coming from Federal or State sources, they intend to go to the Illinois Legislature and ask to be relieved of the responsibility of any such control until those funds are forthcoming.

In the terms of the enforcement activity on the part of our State, the Pollution Control Board has a backlog; the Attorney General has a backlog; and our agency has a backlog. Which cases do we give the highest priority to? We give the higher priority to those municipalities that at least have funds coming. But how much is coming depends on some Federal legislation which has been tied up in Congress now for a year or more. This thing has dragged on and on and on.

Everybody is getting hot about it. It may be that the solution is -- if the Federal Government feels so strongly -- that they should bring a series of these cases; or it may be that this thing should be resolved as a policy matter either at the congressional or at the State legislative level. But as it continues, you are right.

MR. McDONALD: My intention in bringing this up was to get this in front of the conferees, because this is a question that, as far as I am concerned, we don't usually talk about.

MR. BLASER: But the point is: Is this conference the proper forum? Do they have the power, the authority to modify those policies? I think not.

MR. McDONALD: I am not suggesting that they modify policies, but if we are headed, say, on the combined sewer resolution, toward massive slippage because of inability to provide State and Federal funding, this point ought to be well identified now instead of waiting until we get to 1976 and 1977 and we haven't met the dates yet.

MR. BLASER: Let me suggest that it is more than just a question of what to do about the combined sewers and overflows; let's also resolve it as far as sewage treatment.

MR. McDONALD: Sewage treatment, too, of course.

MR. MAYO: Any other comments, gentlemen?

MR. HERT: I would like to make one concluding statement with regard to the supplement to the Status of Compliance on phosphorus report. Of the 12 Indiana communities mentioned, I question why Whiting is 1 of the 12 because our problem with Whiting is the combined sewer overflow problem only at this time with respect to what they are discharging.

Of the other 11, 6 of those communities have advised us, and we have every reason to believe that they will meet the completion date of December 31, 1972, and 3 other communities with respect to having projects under construction within the next few months, although they will not be completed by the 1972 deadline. That leaves only Hobart and Mishawaka without a definite commitment at this time.

MR. BRYSON: Oral, would you stand there for a moment? I have a couple of questions on what you just raised.

If I looked at your table with your discussions of East Chicago, it shows alternate study and plans under way.

Do you have a projected final date on when the plans will be in and when they will start construction and have interim phosphorus or final phosphorus outlined?

MR. HERT: We do have a letter from East Chicago which spells out some dates which indicate that interim facilities will be installed by December 31, 1972.

MR. BRYSON: Now, looking at another community, South Bend, anticipating August 1973 completion, have you explored any possibility of accelerating that date?

MR. HERT: I have explored that. I went into detail on that point last week myself, and they are providing phosphorus removal by upflow clarifiers following existing activated sludge plant. Their existing plant, which is also being expanded, is much overloaded, and the practicality of adding chemicals prior to the time that these overflow clarifiers can be completed is questionable. And these clarifiers — one of them the concrete work is up out of the ground now, and the other one expects to pour the base within the next few weeks. So we do look towards early 1973 or summer of 1973 completion of these.

MR. BRYSON: What sort of removals are they getting now?

MR. HERT: In phosphorus removal?

MR. BRYSON: Yes, sir.

MR. HERT: Their effluent is not running much more than 3 as total phosphorus. They do have a relatively weak phosphorus loading.

MR. BRYSON: Three is the influent or effluent?

MR. HERT: Effluent.

MR. CURRIE: Mr. Chairman, I would just like to make one clarifying statement as to the position that the Illinois Pollution Control Board has taken with regard to the issue raised by Mr. McDonald.

We have squarely held in a number of cases that it is the obligation of every municipality to construct its sewage treatment facilities and it is no defense that they cannot get State or Federal money. We feel very strongly about that, and that is a part of the law of Illinois today.

MR. MAYO: Any other comments from the conferees?

MR. McDONALD: I have a comment on page 9, Mr. Hert, middle paragraph, in regard to chlorides.

Are there any plans for the reduction of chlorides -- of the 260,000 pounds per day?

MR. HERT: We have no plans from industry at this time on this reduction, which is really dissolved solids originating as a part of the plant processes. It involves some of the same problems that our Board and U.S. EPA have been involved in, in dissolved solids from du Pont's wastes -- a question of how you can further reduce those with present day practice treatment methods for discharge to surface water.

MR. McDONALD: Thank you.

MR. MAYO: Any other comments, gentlemen?

Does Indiana have any further presentation?

(Mr. Hert's report follows in its entirety.)

MR. MILLER: Mr. Chairman, I had a request from Karen Griggs from Ashley, if she is here, to speak on the compliance schedule. I understand she is not here.

(Ms. Griggs' written statement, submitted following the conference, follows in its entirety.)

So this would conclude Indiana's presentation as far as phosphorus schedules are concerned.

PROGRESS REPORT
FOR
CONFERENCE
ON
POLLUTION OF LAKE MICHIGAN AND ITS TRIBUTARY BASIN
(ILLINOIS - INDIANA - MICHIGAN - WISCONSIN)

RECONVENED SEPTEMBER 19, 1972

CHICAGO, ILLINOIS

ON BEHALF OF

THE

INDIANA STREAM POLLUTION CONTROL BOARD

AND

THE STATE OF INDIANA

September, 1972

Municipal Sewage Treatment

Elkhart, Kendallville, Ligonier and Portage have completed sewage works projects and South Bend, Nappanee, Lagrange and Valparaiso have projects under construction which include phosphorus removal facilities. Angola, Gary and Goshen have projects approved which include phosphorus removal; the projects also have been approved for 1971-72 construction grant funds and it is anticipated that construction will be underway within the next few months. Final plans and specifications for phosphorus removal facilities have been approved for Chesterton, East Chicago, Michigan City and Mishawaka.

Stream Pollution Control Board orders were issued early this year to all municipalities not already under order or not making significant progress towards installation of phosphorus removal facilities. The Chesterton order was referred to the Attorney General for enforcement in May and the East Chicago, Gary, Goshen, Hobart and Mishawaka orders were referred to the Attorney General in August. Every effort is being made to follow through on these projects. It should be noted that processing of interim Water Quality Management Plans and construction grant applications has materially slowed down municipal sewage works projects.

In addition to the projects which included phosphorus removal, the City of East Gary has completed its connection to Gary; Middlebury, Wakarusa and Wolcottville have completed sewage works projects; and Hammond and Topeka have sewage works projects under construction.

Michigan City has continued making substantial progress towards separation of combined sewers in major areas of the City, and Mishawaka and South Bend have provided combined sewer separation in some areas. East Chicago has completed a demonstration project to provide control of pollution from combined sewers serving approximately 1/3 of the City; however, a study and evaluation of this project has not been completed. East Chicago also completed construction of separate storm sewers for a portion of its drainage area and the Gary Sanitary District has submitted a master plan for sewer improvements. The supplement to Appendix I contains a schedule which would establish dates for provision of facilities to abate pollution from combined sewer overflows. It is anticipated that a hearing on proposed dates will be scheduled for the near future.

An order issued to the City of Hammond provided for control of combined sewer overflows and disinfection of storm water discharges to Lake Michigan with the project to be completed by December 31, 1970. The order also required completion of plant improvements by December 31, 1972. Construction is well underway on plant expansion and control of combined sewer overflow to Lake Michigan in the Robertsdale Area of the Hammond Sanitary District. The City of Whiting entered objections to the Board's order which provided for completion of the Whiting project by May 1, 1971. The City of Whiting has submitted final plans for a new sewage treatment plant to treat all flow from existing combined sewers, including that now discharged to Hammond, with effluent discharge to the Lake George Branch of Indiana Harbor Canal thence to Lake Michigan.

The U. S. Environmental Protection Agency filed 180-day notices against Hammond and Whiting relative to discharges to Lake Michigan. It has not yet made a commitment as to whether or not it would approve a sewage treatment plant for Whiting with discharge of effluent to a tributary of Lake Michigan.

Federal grant applications filed for 1972-73 construction grant funds by thirteen municipalities in the Lake Michigan tributary Basin request over $8 million in Federal and $4 million in State grant funds to help finance construction of projects estimated to cost approximately $22 million.

Projects now under construction by Hammond, Valparaiso, Lagrange, Nappanee, South Bend, and Topeka cost approximately $17.2 million including $8.6 million in Federal and $3.9 million in State grant funds. The eight other projects recently completed cost approximately $9.7 million including $4.8 million in Federal and $2.2 million in State grant funds.

On the basis of plans that have been submitted and those now underway, it is indicated that, if adequate State and Federal funds are available, practically all of the Indiana municipalities in the Lake Michigan tributary basin could have projects for phosphorus removal facilities either completed or under construction by the middle of 1973. The status of municipal wastewater treatment facilities is shown in Appendix I. A separate sheet shows the status of phosphorus removal facilities. (Table I)

Surveillance of wastewater treatment plant operations and the requirement for submission of meaningful monthly reports has continued. In general, this activity, plus the requirement for certification of operators in charge of wastewater treatment plants, has improved the operation and maintenance of these facilities. However, the control of pollution from combined sewer overflows and storm sewer discharges is required to meet water quality standards during wet weather periods. Emphasis has been continued on the requirement for semi-public installations to connect to area-wide sewerage facilities where practicable and for improved operation and maintenance of existing plants.

TABLE I
PHOSPHORUS REMOVAL FACILITIES
LAKE MICHIGAN TRIBUTARIES

Basin	Municipality	1970 Population	Plans Approved	Construction Status	Operation Status	Remarks
1	Chesterton	6,200	8/15/72			Received construction bids 8/27
1	Crown Point	10,900	No			Plans uncertain, Mayor says will have in by 12/31/72
1	East Chicago	47,000	5/18/71			Alternate study and plans underway
1	Gary	175,400	5/16/72			Preliminary bond resolution in progress
1	Hobart	21,400	No			Engineer to advise the City of plans for temp. PO_4 facilitie
1	Michigan City	39,400	8/15/72			City expects to complete by 12/31/72
1	Portage	19,100	5/19/70	Completed May '72	Yes	
1	Valparaiso	20,000	2/16/71	Under Construction		Anticipate completion by 12/31/72
2	Angola	5,100	1/18/72			Anticipate construction by October, 1972
2	Elkhart	43,100	4/21/70	Completed July '72	Yes	
2	Goshen	17,200	2/15/72			Waiting on 71-72 grant offer
2	Kendallville	6,800	10/20/70	Completed Jan.'72	Yes	Operating reports indicate 88% reduction
2	Lagrange	2,100	5/16/72	Under construction		Will be completed by end of 1972
2	Ligonier	3,000	8/18/70	Completed Jan.'72	Yes	Operating reports indicate 90% reduction
2	Mishawaka	35,500	4/18/72	Not started		Nothing definite on start
2	Nappanee	4,200	4/18/72	Under construction		Anticipate completion by 12/31/72
2	South Bend	125,600	1/19/71	Under construction		Anticipate Aug.'73 completion

SWKim/lsm
8/14/72

INDUSTRIAL WASTE TREATMENT AND CONTROL

Continued progress has been made on completion of waste treatment facilities at Indiana industries with improved waste treatment operation and reduction of waste loadings by inplant changes.

Cities Service Oil Company, East Chicago, completed biological treatment facilities during July, 1971. Cities Service Oil Company announced during the spring of 1972 that the East Chicago refinery would be closed permanently on January 1, 1973. No information is available on future use of the plant site.

Mobil Oil Corporation, East Chicago, is continuing inplant reuse of treated wastewaters and is investigating connection to the East Chicago Sanitary District sewerage system. Mobil Oil Corporation reduced its wastewater flow from approximately 2.5-mgd in 1968 to 0.5-mgd in 1972. It pumps about 1.8-mgd from the Indiana Harbor Canal; however, evaporation losses reduce the discharge to about 1/3 of the intake. The treatment provided frequently shows an improvement in the effluent over the intake quality in terms of oil, suspended solids and BOD.

The advanced waste treatment systems completed by American Oil Company, Whiting and Atlantic Richfield Company, East Chicago, are working effectively. Inplant controls are being intensified at American Oil Company and Cities Service Oil Company to eliminate peak loads that causes upsets. American Maize Products Company, Hammond, has completed inplant equipment changes that will bring its effluent within recommended guidelines for discharge into the Lake Michigan.

Evaluation of waste treatment facilities completed during 1969 and 1970 at Inland Steel Company, Youngstown Sheet & Tube Company, and U. S. Steel Corporation, showed that additional pollution control measures were needed.

An enforcement hearing was scheduled with U. S. Steel Corporation and an order issued on December 1, 1970, outlining completion of additional treatment facilities by December 31, 1972. The Corporation filed for judicial review in Lake Superior Court and the Board's order was set aside. The court decision has been appealed by the Board and the matter is pending in the Indiana Supreme Court. The U. S. Steel Corporation has completed oil and solids separation facilities on the Sheet & Tin Mill discharge and added chemical treatment to the Blast Furnace flue dust treatment facilities to improve that treatment; however, additional treatment is needed. The State presently is working with the U. S. Environmental Protection Agency and Justice Department to develop requirements for U. S. Steel Corporation.

Inland Steel Company has continued to make inplant production modifications and treatment plant improvements, including the elimination of its last discharge to Lake Michigan by recycling. Additional reductions are needed in the effluent from the terminal treatment plant, coke plants, and basic oxygen process and several of the older rolling mills. The Board is presently establishing time schedules for the additional treatment needed to meet the Water Quality Standards outlined by Regulation SPC 7R.

Youngstown Sheet & Tube Company, East Chicago, has upgraded facilities at the central water treatment plant to prevent plant upset by slug discharges, completed additional flow controls to insure maximum recycle of blast furnace gas washer water, and made internal changes in the coke plant to insure that these wastes are discharged to the East Chicago sewerage system. Additional pollution control work is needed in the areas of pickle liquor disposal, the coke plant and rolling mill area. The Board is establishing time schedules for additional facilities needed to meet the Water Quality Standards outlined in Regulation SPC 7R.

Table 2 shows a comparison of effluent data for industry for 1968 and 1971. It is noted that oil has been reduced 52 percent, phenol has been reduced 76 percent, BOD has been reduced 64 percent and suspended solids have been reduced 31 percent during this period.

During mid 1970, the Board advised E. I. du Pont de Nemours & Company that additional waste treatment was needed to reduce levels of suspended solids, acidity, zinc and sulfates in its effluent by December 31, 1972. During the period the staff was working with the Company to develop a program, the Justice Department, in February, 1971, filed a civil action under the 1899 Refuse Act. E. I. du Pont submitted proposals for waste treatment and controls; however, the problem has not been resolved because of not being able until recently to specify what effluent limitations are desired and whether deep-well disposal would be a satisfactory solution to the problem. It remains to be determined what can be done to reduce effluent characteristics to desired levels with treatment methods available for discharge to the Grand Calumet River, because the Environmental Protection Agency has ruled that deep-well disposal is not a satisfactory solution.

Investigations and results of samples show that Simmons Company, Munster, requires additional wastewater treatment for cyanide, oil, suspended solids, and chromium in order to meet the Water Quality Standards. A time schedule has been recommended requiring final plans by March 1, 1973, and completion of construction by June 1, 1974.

An enforcement hearing was held with Maynard Metals Company, Schererville, concerning pollution of a tributary of Hart Ditch with ammonia and tin. An order was issued on April 11, 1972, outlining completion of facilities by December 31, 1972. The Company has eliminated the discharges.

Since the March 23, 1971, report, Middlebury Cooperative Creamery, Middlebury, American Motors Corporation, (General Products Division) South Bend, and the Pennsylvania - New York Central Transportation Company, Elkhart, have completed construction of wastewater treatment facilities and are discharging effluents into municipal sewerage systems. Gentner Packing Company, South Bend, completed an anaerobic-aerated lagoon system during late 1971. The Weatherhead Corporation completed facilities at its Angola plant in mid 1972 and has additional facilities under construction at its Syracuse plant which should be finished before December 31, 1972.

A recent report on chloride discharges for industries discharging in excess of 10,000 pounds per day indicated that four steel mills and two refineries were discharging a total of approximately 260,000 pounds of chlorides per day.

Northern Indiana Public Service Company has a cooling tower under construction to provide cooling of condenser water from the existing steam electric generating plant and an additional generating plant that is under construction at Michigan City. It also plans to provide cooling facilities for the existing steam electric and proposed nuclear plant at Bailly. Other Indiana electric generating plants are conducting studies to determine if thermal control requirements can be met by changes in intake and discharge structures.

A listing showing the status of industrial plants appears in Appendix II.

TABLE 2
EFFLUENT MONITORING DATA

COMPANY	1971 flow mgd	Oil 1968 lbs./day	Oil 1971 lbs./day	Phenol 1968 lbs./day	Phenol 1971 lbs./day	BOD 1968 lbs./day	BOD 1971 lbs./day	Suspended Solids 1968 lbs./day	Suspended Solids 1971 lbs./day
American Oil Company									
Process	28.8	4,131	864	190.3	82	9,700	4,233	NA	2,842
Cooling	97.6	1,568	917	28.3	27	8,752	1,234	NA	
Atlantic Richfield Co.	4.8	1,763	215	116	21	4,592	582	1,278	1,136
Cities Service Oil Company	66	485	1,080	86	42	3,460	2,800	1,230	3,200
(6 months 1972)	(59)		(685)		(5.6)		(2,335)		(1,893)
Mobil Oil Corporation	0.79	456	25	88.9	15.7	1,680	279	1,211	164
American Maize Co.	10.94	NA	NA	NA	NA	7,560	2,270	32,100	1,271
Union Carbide Chemical Corporation	48.57	630	189	NA	NA	3,927	2,835	682	882
Inland Steel Co.	922	24,210	14,068	710	136 *	NA	NA	40,808	31,424
Youngstown Sheet & Tube Company	272	3,400	5,772	43	(14) *	NA	NA	92,600	76,104
U. S. Steel Corporation									
River	426	48,821	16,835	268	26 *	NA	NA	229,000	137,852
Lake	245	13,280	7,531		-	-	-	8,490	30,175
Totals		98,734	47,496	1530	363	39,671	14,233	407,399	282,208
% Reduction			53		76		64		31

NA - Not available

() Average 1st 6 months of 1972

*Inland Steel and Youngstown discharge coke plant waste to East Chicago; U.S. Steel discharges to Gary.

WATER QUALITY MONITORING

A review of water quality data for tributary streams discloses a significant improvement for most parameters in the period from 1968 through 1971 as shown by the following:

1. Indiana Harbor Ship Canal
    a. Dissolved Oxygen - General improvement on annual average basis; met criteria on 60% of samples in 1971. (1971 average 3.6 mg/l)

    b. Cyanide - Downward trend, criteria met on 70% of samples in 1971 as opposed to 44% in 1968. (1971 average 0.123 mg/l)

    c. Phenols - Annual average shows downward trend 1969-1971. The criteria is met on more samples in later years (55% of samples met criteria in in 1971 as opposed to 7.7% in 1968, 1969. (1971 average 0.08 mg/l)

    d. Oil - Average values general steady except for high in 1970. 74% of samples met criteria of 5.0 mg/l in 1971. (1971 average 4.6 mg/l)

    e. Ammonia Nitrogen - No trend apparent on mean values, but mean is highest in 1971. Hardly any samples met the criteria in the four-year period. (1971 average 4.5 mg/l)

    f. Copper - No trend apparent. Annual average values range from 0.022 to 0.033 mg/l. (1971 average 0.025 mg/l)

    g. Cadmium - Annual average values generally constant except for high in 1969. Lowest annual average in 1971. (0.10 mg/l)

    h. Nickel - General downward trend in annual average last three years, with 1971 average almost the same as 1968 of 0.024 mg/l.

i. Lead - Lowest annual average in 1971. (0.036 mg/l)

j. Zinc - Significant downward trend in 1970 and 1971, annual average twice as low as in 1968 and 1969. (1971 average 0.14 mg/l)

k. Fecal Coliform - Apparent degradation in 1971; only 9/21 samples met criteria in 1971 as opposed to 17/22 in 1970.

l. Phosphorus - 1971 and 1970 annual average concentrations are more than twice the average concentration in 1969. The criteria was met on only 1 sample in 1971. The 1971 annual average of 0.34 mg/l was a little more than three times higher than the criteria.

2. Burns Ditch

   a. Dissolved Oxygen - General upward trend on annual average basis. Except for 1970, minimums generally meet criteria of 6.0 mg/l.

   b. Cyanide - Erratic but higher in 1971 (average 0.069 mg/l)

   c. Phenol - General downward trend on annual average basis, lowest in 1971 (o.0034 mg/l)

   d. Oil - Erratic, but 1970 and 1971 data is higher than 1968 and 1969 data. (1971 average 4.47 mg/l)

   e. NH_3 - General downward trend on annual average basis, lowest in 1971 (0.353 mg/l)

   f. Phosphorus - No trend noted except for the rise in 1970 to 0.43 mg/l versus 0.33 mg/l in 1969 and 1971.

   g. Fecal Coliform - Steady with samples meeting criteria

95% of time in 1970 and 1971.

h. Cu, Cd, Ni, Pb, Zn - Only 6 months of data in 1971, but all were low - averages from 0.010 mg/l (Cd) to 0.060 mg/l (Zn)

3. Trail Creek

a. Dissolved Oxygen - Generally steady on the average, but minimum rising (4.0 in 1969 to 4.6 in 1971). However, does not meet criteria in SPC 12 at all times.

b. Cyanide - Steady, average for all years 0.05 mg/l.

c. Phenol - No trend observed average of 0.0028 mg/l in 1971.

d. Oil - Erratic, no definite trend; 1971 average 4.58 mg/l.

e. NH_3 - No definite trend, 1971 average 1.77 mg/l.

f. Copper - No definite trend, low (0.035 mg/l in 1971.

g. Cadmium - Distinct downward trend (0.010 mg/l in 1971.

h. Nickel - Erratic, but low (0.026 mg/l in 1971).

i. Lead - Erratic, but low. Average 0.028 mg/l in 1971.

j. Zinc - Distinct downward trend. Average 0.135 mg/l in 1971.

k. Phosphorus - Slight downward trend with average of 0.9 mg/l in 1971. This was probably due to Michigan City's plant studies on phorphorus removal.

l. Fecal Coliform - Slight upward trend with 14 of 19 samples meeting criteria in 1971 versus 16 of 18 samples in 1970.

4. Grand Calumet River (Hohman Avenue, West to Illinois)

   a. Dissolved Oxygen - General upward trend, from 3.9 mg/l average in 1968 to 4.9 mg/l in 1971.

   b. Cyanide - General downward trend. Samples met criteria 100% in 1971 with average of 0.05 mg/l.

   c. Phenol - General downward trend. The percentage of samples meeting criteria in 1971 was 96%, a significant improvement over the three previous years: (1968-73%), (1969-46%) and (1970-42%). (1971 average 0.0046 mg/l)

   d. Oil - Significant improvement: 1971 average is a third of that in 1968. Met criteria 48% of samples in 1971, with average of 5.28 mg/l.

   e. NH_3 - A distinct downward trend in 1968, 1969, and 1970 with a sharp rise in 1971; however, criteria was met only a few times in 4 years. (1971 average 9.414 mg/l)

   f. *Copper - Average 0.03 mg/l in 1971.

   g. *Cadmium - Average 0.01 mg/l in 1971.

   h. *Nickel - Average 0.027 mg/l in 1970, 0.031 mg/l in 1971.

   i. *Lead - Average 0.069 mg/l in 1971.

   j. *Zinc - Mean 0.182 mg/l in 1970, 0.100 mg/l in 1971.

   * Based on two years 1970-71.

   k. Phosphorus - An upward trend but no data was collected in 1970.

   l. Fecal Coliform - Definite downward trend over four years (102,080 MPN/100 ml to 12,666 MPN/100 ml) on an annual average basis. Also, percentage of samples meeting criteria increased from 23% and 15% in 1968 and 1969 to 59% and 55% in 1970 and 1971, respectively.

The summary of data from samples collected weekly from Lake Michigan beaches also reflects improvement in water quality from a fecal coliform analysis. In the past two years only the Whiting beach has consistently failed to meet criteria. Approximately 1/3 of the Hammond beach samples have failed to meet criteria. These data are summarized on Table 3.

The results of pesticide monitoring from stations in Indiana Harbor, Burns Ditch, Trail Creek and the St. Joseph River at South Bend showed very low values. The water samples generally showed less than 0.010 ug/l. (Only 6 of 424 analysis were above this value) Only 40 of 160 analysis of sediment samples showed values above 0.010 ug/gram with only 17 of 176 analysis higher. Only 47 of 184 analysis of invertabrates showed concentrations above 0.010 ug/gram with these values generally under 0.1 ug/gm. The zooplankton showed the highest concentrations with 11 of 24 analysis over 0.010 ug/gram; One sample showed 0.735 ug/gram of DDD, 0.35 ug/gram of DDE and 0.296 ug/gram of DDT.

Analysis of samples from water supply intakes at Hammond, Whiting, East Chicago, Gary, and Michigan City generally showed a slight improvement for most parameters over the past three years. The averages for 1971 indicated the following: cyanide - 0.05; phenols - 0.001; oil - 3.5 to 5.0; ammonia nitrogen - 0.1; copper - 0.02 to 0.06; cadmium - 0.01; nickel - 0.02; lead - 0.02; zinc - 0.3 to 0.4; and mercury - 0.0008 to 0.0012 (all results in mg/l).

TABLE 3

Lake Michigan Beaches
Number of Months of Total Months Sampled
Meeting Criteria of SPC 4R *

Beach	1972	1971	1970	1969	1968
Dunes State Park	3/3	5/5	4/4	4/5	5/5
Porter	3/3	5/5	4/4	5/5	3/5
Michigan City	3/3	5/5	4/4	5/5	--
Dunes Acres	3/3	5/5	4/4	4/5	5/5
Ogden Dunes-East	3/3	4/4	3/4	3/5	3/5
Ogden Dunes-West	3/3	4/4	4/4	3/5	3/5
Gary-Wells Street	3/3	4/4	4/4	4/5	5/5
Gary-Marquette Park	3/3	4/4	4/4	5/5	3/5
Gary-Lake Street	3/3	4/4	4/4	5/5	4/4
East Chicago	3/3	4/4	4/4	5/5	3/5
Whiting	0/3	0/5	3/4	2/5	1/5
Hammond	1/3	4/4	4/4	4/5	1/5
Wolf Lake-120th Street	3/3	4/4	4/4	5/5	5/5
Wolf Lake-State Line	3/3	4/4	4/4	5/5	5/5

* Whole-Body Contact: The fecal coliform content at all recognized beach areas shall not exceed 200 per 100 ml as a monthly geometric mean based on not less than five samples per month; nor exceed 400 per 100 ml in more than ten percent of all samples taken during a month.

APPENDIX I

Municipal Waste Treatment
Lake Michigan Basin
Lake, Porter, and LaPorte Counties

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required (1)	Time-Table	Remarks
Chesterton	6,177	Activated sludge, chlorination	1963	1.50	1.02	Little Calumet R., Burns Ditch	Phosphorus removal	1972	Final plans approved 8/15/72. SPCB order referred to Attorney General.
Crown Point	10,951	Activated sludge, chlorination	1966*	1.80	1.05	Beaver Dam Ditch Deep River Burns Ditch	Phosphorus (2) removal,	1972	SPCB order issued.
							Advanced waste treatment	1977	
East Chicago	46,982	Activated sludge, chlorination	1960*	20.00	14.00	Grand Calumet R., Indiana Harbor	Advanced waste treatment,	As soon as practicable	Final plans approved 12/21/71.
							Phosphorus removal	1972	SPCB order referred to Attorney General.
							Storm water disinfection and control	As soon as practicable	Demonstration project under study.
East Gary	9,858	Connected to Gary.							
Gary	175,415	Activated sludge, chlorination	1965*	60.00 +20.00 Additional primary capacity	45.50	Grand Calumet R., Indiana Harbor	Advanced waste treatment	As soon as practicable	
							Phosphorus (2) removal	1972	Plans approved 5/11/72 SPCB order referred to Attorney General.
							Storm water disinfection and control	As soon as practicable	

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*Last major improvement

(1) 80 percent phosphorus reduction required of municipalities by 1972 (excluding Hammond and Whiting).

(2) Applications on file for construction grants.

APPENDIX I

Municipal Waste Treatment
Lake Michigan Basin
Lake, Porter, and LaPorte Counties (continued)

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required (1)	Time-Table	Remarks
Hammond	107,790	(Treatment required of storm and combined sewer overflows to Lake Michigan)					Disinfection and control	1970	Robertsdale project under construction.
Whiting	7,247	(Treatment required of storm and combined sewer overflows to Lake Michigan)					Disinfection and control	1970	Final plans approved 2/15/72. SPCB order referred to Attorney General.
Hobart	21,483	Activated sludge, chlorination	1962*	2.00	1.77	Deep River, Burns Ditch	Phosphorus (2) removal Advanced waste treatment	1972 1977	SPCB order referred to Attorney General. Under Study, engineer employed.
Michigan City	39,369	Activated sludge, chlorination	1968*	15.00	10.30	Trail Creek	Advanced waste treatment Phosphorus (2) removal	As soon as practicable 1972	Under Study, engineer employed. Final plans approved 8/15/72.
Portage	19,127	Activated sludge phosphorus removal, chlorination	-	2.5	-	Burns Ditch	-	1970	Completed.
Porter	3,058	Connected to Chesterton	-	-	-	Calumet River Burns Ditch	-		
Valparaiso	20,020	Activated sludge, chlorination	1954	2.00 6.00 (UC)	2.46	Salt Creek, Little Calumet, Burns Ditch	Expansion, Phosphorus removal, Advanced waste treatment	1972 1972 1977	Under construction including phosphorus removal.

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* Last major improvement.

(1) 80 percent phosphorus reduction required of municipalities by 1972 (excluding Hammond and Whiting).

(2) Applications on file for construction grants.

APPENDIX I

Municipal Wastewater Treatment
Lake Michigan Basin - St. Joseph River

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required	Time-Table	Remarks
Albion	1,498	Lagoon, Chlorination	1958	0.15	0.08 (est.)	Tributary to Elkhart River	-	-	-
Angola	5,117	Trickling filter. chlorination	1963*	0.85	0.80	Pigeon Creek, Pigeon River	Phosphorus (2) removal Advanced waste treatment	As soon as practicable 1977	Final plans approved 1/18/72, including phosphorus removal.
Ashley	721	Activated sludge, 7-day terminal lagoon	1966	0.08	0.05	Tributary to Turkey Creek, Pigeon River	Chlorination	1969	Under Study
Cromwell	475	None	-	-	-	Turkey Creek, Elkhart River	Secondary treatment and chlorination (2)	1972	Preliminary report submitted. (2)
Elkhart	43,152	Primary, chlorination	1955	12.0	12.0 to 15.00	St. Joseph R.		1969	Under construction, including phosphorus removal.
		Secondary, phosphorus removal	UC	20.0				1972	
Fremont	1,043	filter, chlorination	1958	0.15	0.12	Tributary to Crooked Creek, Fawn River			

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* Last major improvement

(2) Applications on file for construction grants.

APPENDIX I

Municipal Wastewater Treatment
Lake Michigan Basin - St. Joseph River (continued)

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required	Time-Table	Remarks
Goshen	17,171	Activated sludge, limited chlorination	1963*	3.50	2.40	Elkhart River	Chlorination and(2) phosphorus removal	1972	Plans approved. SPCB order referred to Attorney General.
Kendallville	6,383	Trickling filter, chlorination Phosphorus removal	1972*	2.68	1.84	Henderson Lake North Branch Elkhart River		As soon as practicable	Completed January, 1972.
Lagrange	2,053	Trickling filter, chlori-nation	1958	0.38	0.19	Fly Creek Pigeon River	Phosphorus (2) removal	1972	Under construction.
Ligonier	3,034	Trickling filter, chlorination, phosphorus removal	1972*	0.52	0.35	Elkhart River		1972	Completed. (2)
Milford Junction	1,264	None		-	-	Turkey Creek, Elkhart River	Secondary treat-(2) ment and chlor-ination	1972	Plans approved.
Mishawaka	35,517	Activated sludge, chlorination	1952 1966*	8.30	9.00(1)	St. Joseph R.	Expansion and (2) phosphorus removal	1972	Plans approved. SPCB order referred to Attorney General.
Nappanee	4,159	Activated sludge, chlorination	1963	0.90	0.70	Tributary Turkey Creek, Elkhart River	Phosphorus removal (2)	1972	Under construction.

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* Last major improvement.

(2) Applications on file for construction grants.

APPENDIX I
Municipal Wastewater Treatment
Lake Michigan Basin - St. Joseph River (continued)

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required	Time-Table	Remarks
South Bend	125,580	Activated sludge expansion, chlorination and	1955	24.0(Sec) 24.0(Prim)	32.00(3)	St. Joseph River	Chlorination	As soon as practicable	Under construction.
		phosphorus removal	UC	48.0				1972	
Syracuse	1,546	Trickling filer, chlorination	1962	0.25	0.20	Turkey Creek, Elkhart River	-	-	-
Topeka	677	Lagoon, chlorination	UC	0.58		Little Elkhart R.		1972	Under construction.
Wakarusa	1,160	Lagoon, chlorination	1970	-	-	Baugo Creek Elkhart River	-	-	-
Wolcottville	915	Trickling filter, chlorination	1972	0.16	0.05	Little Elkhart R.	-	-	Completed.
Middlebury	1,055	Trickling filter, chlorination	1972	0.2	0.08	Little Elkhart R.	-	-	Completed.

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* Last major improvement

(2) Applications on file for construction grants.
(3) All dry weather flow is receiving secondary treatment.

ABATEMENT OF POLLUTION FROM

COMBINED SEWER OVERFLOWS

Chesterton East Gary Goshen Griffith Highland Hobart Michigan City Valparaiso	Report by June 30, 1973 Final plans by June 30, 1974 Construction by March 1, 1975 Completion by December 31, 1976
East Chicago Elkhart Hammond Mishawaka South Bend	Report by September 30, 1973 Final plans by December 31, 1974 Construction by September 30, 1975 Completion by December 31, 1977
Gary	Report by July 31, 1972 (SPCB Order) Final plans by July 31, 1974 Construction by March 1, 1975 Completion by December 31, 1977
Whiting	Now in violation of Order, proceed with enforcement

September, 1972

APPENDIX II

INDUSTRIAL WASTE TREATMENT CONTROL FACILITIES
LAKE MICHIGAN BASIN

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
St. Joseph River					
Angola Reduction Company Angola	Septic tank - absorption system	Anaerobic-aerobic lagoon	A	0.010	Soil Absorption
Weatherhead Company Angola	Angola sewer	Oil separation, cyanide destruction, chromium reduction and cyanide isolation facilities	A	0.175	Tributary of Crooked Lake
Elcona Foods, Inc. Elkhart	Septic tank - absorption system	Grease separation, blood collection and soil absorption pond	A	0.040	None
Pennsylvania New York Central Transportation Company Elkhart	Elkhart sewer	Oil separation and soil absorption ponds	A	0.050	Elkhart sewer
John L. Whisler and Son, Inc. Elkhart	Septic tank - absorption system	Fine screens, blood collection, grease separation and soil absorption ponds	A	0.150	None

APPENDIX II (continue

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Penn Electric Switch Company Goshen	Goshen sewer	Oil separator, cyanide isolation and settling tanks	A	0.225	Goshen sewer
Pine Manor, Inc. Goshen	Goshen sewer	Grease separation, blood collection and soil absorption pond	A	0.040	None
Kendallville Fertilizer Company Kendallville	Septic tank - absorption system	Septic tanks and waste stabilization pond	A	0.020	Henderson Creek
Springer Corporation Ligonier	Septic tank - absorption system	Oil separation tank	A	0.015	Elkhart River
Middlebury Co-operative Creamery, Inc. Middlebury	Septic tank - absorption system	Connection to Middlebury	A	0.025	Middlebury sewer
Maple Leaf Farm Processing Plant Milford	Septic tank - absorption system	Waste stabilization pond	A	0.080	Waubee Lake
Indiana-Michigan Electric Company Twin Branch Station Mishawaka	Septic tank - absorption system	Ash settling ponds	A	84.0	St. Joseph River
U. S. Rubber Company Mishawaka	Mishawaka sewer	In-plant control, primary clarification, chemical treatment, flocculation, clarification and vacuum filtration	A	1.300	St. Joseph River
Animal By-Products Corporation New Carlisle	Septic tank - absorption system	Soil absorption pond	A	0.020	None

APPENDIX II (continued

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
New Paris Creamery Company New Paris	Septic tank - absorption system	Aerated lagoon	A	0.225	Turkey Creek
Polo Produce, Inc. New Paris	Septic tank - absorption system	Fine screens, blood collection, grease separation and soil absorption pond	A	0.050	None
County Line Cheese Company Shipshewana	Septic tank - absorption system	Ridge and Furrow irrigation	A	0.015	None
General Products Division, AMC (formerly Kaiser Jeep Corporation) South Bend	Septic tank - absorption system	None	A	0.020	South Bend sewer
Gentner Packing Company South Bend	Septic tank - absorption system	Blood collection, grease separation and anaerobic-aerobic waste stabilization pond system	A	0.215	Autin Ditch
Weatherhead Company Syracuse	Syracuse sewer	Cyanide destruction and cyanide isolation	I	0.225	Turkey Creek
Grand Calumet River - Indiana Harbor Ship Canal - Lake Michigan					
Northern Indiana Public Service Co. Bailly Station Baileytown	Septic tank - absorption system - no discharge	Ash disposal with soil absorption of sluicing water - no discharge	A	--	Lake Michigan (cooling water)
American Steel Foundries Company East Chicago	East Chicago Sanitary District	Settling basin	A	0.500	Indiana Harbor Ship Canal
Blaw Knox Company East Chicago	East Chicago Sanitary District	Settling tank and filter	A	0.425	Indiana Harbor Ship Canal

APPENDIX II (continued

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Cities Service Oil Company East Chicago	East Chicago Sanitary District	Oil separation tanks, ammonia-sulfide strippers and separate disposal of waste caustic and acids	A	73.0	Grand Calumet River
E. I. du Pont de Nemours & Co., Inc. East Chicago	East Chicago Sanitary District	Acid neutralization facilities, settling basin and controlled discharge	I	9.60	Grand Calumet River
Inland Steel Company East Chicago	Three trickling filter plants with effluent chlorination	Coke plant cooling water recirculation, phenol extraction, napthalene recovery and discharge of ammonia still wastes to East Chicago Sanitary District. Sewers, scale pits, oil separator, flue dust thickeners, chemical clarification facilities and deep well disposal system for waste pickle liquor	A	900.00	Indiana Harbor Ship Canal and Lake Michigan
M & T Chemicals Company East Chicago	East Chicago Sanitary District	Spent caustic sold for recovery and settling pond	A	0.075	East Chicago sewer system
Mobil Oil Company East Chicago	East Chicago Sanitary District	Oil separators, ammonia sulfide stripper, in-plant control, ballast tank oil separator, separate disposal of waste caustics and acids, air flotation and water reuse	A	2.50	Indiana Harbor Ship Canal

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Atlantic-Richfield Company (formerly Sinclair Refining Company) East Chicago	East Chicago Sanitary District	Oil separators, ammonia sulfide stripper, in-plant control, ballast tank oil separator and separate disposal of waste caustics and acids	A	5.50	Indiana Harbor Ship Canal
U. S. Gypsum Company East Chicago	East Chicago Sanitary District	Settling basin and save-all clarifiers	A	4.50	East Chicago Sewer
Union Carbide Chemical Corporation Linde Air Division East Chicago	East Chicago Sanitary District	Settling ponds and oil separation	A	0.250	Indiana Harbor Ship Canal
Youngstown Sheet and Tube Company East Chicago	East Chicago Sanitary District	Scale pits, oil separators, settling basins, phenol extraction, napthalene recovery, lime still waste to East Chicago sewers, sand filtration, chemical treatment and waste pickle liquor neutralization on hot slag	I	250.00	Indiana Harbor Ship Canal and Lake Michigan
Vulcan Materials Company Gary	Septic tank - absorption system	Spent caustic sold for recovery	A	--	Grand Calumet River
American Maize-Products Company Hammond	Hammond Sanitary District	In-plant control, anaerobic lagoon, aerated lagoon, starch filtrate clarifiers, chlorination and some waste discharged to Hammond sewers	I	14.00	Lake Michigan
Commonwealth Edison Co., Inc. Hammond	Chicago Sanitary District	Fly ash settling bins and bottom ash settling basins	A	1000.00	Lake Michigan

APPENDIX II (continu

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
American Oil Company Whiting	Whiting sewers	Oil separators and aerated lagoon	A	140.00	Lake Michigan
Union Carbide Chemical Corporation Chemicals Division Whiting	Whiting sewers and East Chicago Sanitary District	Oil separators, settling basins and in-plant control	A	54.00	Lake Michigan and Indiana Harbor Ship Canal
Union Tank Car Company Whiting	Hammond Sanitary District	Oil separation and discharge to the Hammond Sanitary District	A	0.030	Hammond sewerage system
American Bridge Division U. S. Steel Corporation Gary	Gary Sanitary District	None (cooling water only)	A	--	Grand Calumet River
Gary Works West (formerly Gary Sheet and Tin Mill) U. S. Steel Corporation Gary	Gary Sanitary District	Scale pits, oil separators, deep well, sand filtration and chemical treatment	I	63.00	Grand Calumet River - Lake Michigan
Gary Works East (formerly Gary Steel Works) U. S. Steel Corporation Gary	Gary Sanitary District	Scale pits, flue dust thickeners, settling basins and discharge of portion of coke plant wastes to Gary Sanitary District	I	370.00	Grand Calumet River
Gary Works East (formerly National Tube Division) U. S. Steel Corporation Gary	Gary Sanitary District	Scale pits, oil separation and acid collection	A	41.0	Grand Calumet River
Northern Indiana Public Service Co. Mitchell Station Gary	Septic tank - subsurface sand	Fly ash and bottom ash settling ponds	A	440.00	Lake Michigan

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Steiner Tissue Division Georgia-Pacific Corporation Gary	Gary Sanitary District	Clarifiers	A	1.00	Gary sewer
Universal Atlas Cement Company U. S. Steel Corporation Gary	Trickling filter	Oil separation	A	12.00	Lake Michigan
Little Calumet River - Burns Ditch - Lake Michigan					
Bethlehem Steel Corporation Burns Harbor Plant Chesterton	Activated sludge, chlorination and discharge to terminal lagoon	Scale pits, chemical flocculation-clarification units, oil separators, acid neutralization, deep well disposal system, cyanide isolation facilities, water reuse and cyanide treatment	A	130.00	Little Calumet River
American Chemicals Company Griffith	Septic tank - absorption system	Incineration and waste holding lagoon	A	--	Tributary Turkey Creek
Great Lakes Dressing Plant Michigan City	Septic tank - absorption system	Waste absorption pond	A	--	Trail Creek
American Cyanamid Company Michigan City	Septic tank - absorption system	Settling basins and deep well disposal system	A	--	Trail Creek
Northern Indiana Public Service Co. Michigan City	Septic tank - absorption system	Ash settling ponds	A	--	Lake Michigan
Phillips Drill Company Michigan City	Septic tank - absorption system	Oil separator, and contract disposal	A	0.025	Trail Creek for cooling water
Royal Metal Corporation Michigan City	Activated sludge	Ion exchange, settling tank and settling lagoon	A	0.040	Trail Creek

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Midwest Steel Division National Steel Corporation Portage	Activated sludge with chlorination	Cyanide isolation facilities, chemical treatment with clarification and deep well disposal system	A	4.5	Burns Ditch
Vale City Packing Company Valparaiso	Septic tank - absorption system	Septic tank and absorption system	A	0.015	None
Indiana General Corporation Valparaiso	Septic tank - absorption system	Absorption pond and deep well	A	0.030	None
Little Calumet River (West)					
Simmons Company Munster	Hammond Sanitary District	Cyanide destruction and chromium reduction	I	0.150	Little Calumet River
Maynard Metals Company Schererville	Septic tank - absorption system	Settling ponds	A	0.020	Tributary Hart Ditch
Grand Calumet River (West)					
LaSalle Steel Company Hammond	Hammond Sanitary District	Acid neutralization and clarification and contract disposal	A	0.050	Grand Calumet River and Hammond sewerage system
Wolf Lake					
Lever Brothers Company Hammond	Hammond Sanitary District	In-plant control, air flotation, effluent chlorination and discharge of some waste to Hammond Sanitary District	A	9.7	Wolf Lake

A Adequate
I Inadequate

9/1/72

STATE of INDIANA

INDIANAPOLIS 46206

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
633-4420

September 28, 1972

Mr. Francis T. Mayo
Regional Administrator
Region V
Environmental Protection Agency
1 North Wacker Drive
Chicago, Illinois 60606

Dear Mr. Mayo:

Re: Lake Michigan Conference Report

Enclosed is a written statement by Ms. Karen Griggs with reference to the Town of Ashley. The record of the Conference will show that she asked to make a statement but was not present when called on. Please include this statement for the record.

Very truly yours,

Perry E. Miller
Technical Secretary

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enclosure

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STATE OF INDIANA
STREAM POLLUTION CONTROL
BOARD

To: Lake Michigan Enforcement Conference, September 19, 1972
Perry Miller, Indiana Stream Pollution Control Board

My name is Karen Griggs. I live at R. R. 1# Ashley, Indiana. I have a deep conviction that Lake Michigan can only survive the heat and waste in its future if the residents and governmental bodies of the Great Lakes Basin view its web to the beauty of the Great Lakes as worthy of preservation and make up lost time in efforts to cease the degradation of its waters.

Ashley Indiana is a small community on the DeKalb-Stuben county line in northeastern Indiana. Its population is approximately 800. Ashley is worthy of notice as it is one of three Indiana communities that have no disinfection in violation of the 1968 Conference. Continuous disinfection for municipal effluent should have been in operation, according to the 1968 reccomendations, by May of 1969.

I speak not to call the wrath of authority upon Ashley's people but to speak to the problems and concerns since they demonstrate the failure of the grant system, agency contacts, and legislative action.

In 1965 this community constructed a sewage collection system at a cost of $300,000. Only 1/7 of this amount was through the grant program. This debt will not be paid until the year 2002. The neighbering, smaller town of Hudson, with 500 people, could join into the system but its residents have chosen to continue with private wells and septic tanks. The Ashley plant has a capacity of 3 times the present population.

Every day an estimated 50,000 to 70,000 gallons of effluent enter the county ditch, thence flowing to the Pigeon River, through the Game Refuge, some miles west. September 13 a serious thunderstorm caused approximately 100,000 gallons to fill the system. There are no combination storm and sanitary sewers, according to town officials.

Statement of Karen Griggs to the Lake Michigan Enforcement Conference, 1972

Presently, to compensate for shallow systems, a lift station is being constructed to take care of new homes and industry on the west edge of town. The collected sewage now goes to a grinding tank, an aeration system, and then to a lagoon. About two weeks elapse during this aeration and holding process. Testing is done twice a week for D.O. at the final pond and results in summer 5-7 ppm., winter 6-9 ppm. Tested five times a week for B.O. D., the raw sewage at 200-300 ppm. is reduced to 20 in the summer and five in the winter.

I believe that the state agency has not held hearings on this community for two years, but Ashley's plans for chlorination and phosphate removal might come to fruition by 1975. Economics will primarily determine the date of treatment for this community.

The expense of this is an estimated $50-60,000, or over $300 per family. I believe that an awareness exists that construction delays increase costs. Presently the sewage fees are based on water consumption. Water used in any amount up to 3000 gallons costs $1.75 and sewage is $6.60. The resulting base rate is $8.64. The 1936 water system needs funds for iron removal, larger storage, an 8 inch main to 2 new industries and a savings account for future needs. Ashley is petitioning for a rate increase to its water charges.

Financing the needed sewage treatment is a serious problem for this community as well as others in the county, although they are in the Erie basin. As Hudson's wells and septic tanks serve its residents at their private expense, Ashley faces slow or no grant assistance for its public system. A bond issue would take nearly a year to be approved, but a lease-purchase agreement, if a benefactor could be found, would include higher interest expense.

Statement of Karen Griggs to the Lake Michigan Enforcement Conference, 1972.

Standards for treatment should be effluent standards, since a "percent of removal" standard or an overall standard for a particular body of water results in uneven quality and degradation of portions of the water.

This community of Ashley Indiana with its good intentions and economic bind needs attention, not because of vast pollution of South Bend size, but because it needs to acquire funds for treatment and has not received any significant amount in the past.

The legislature has neglected its responsibility to match federal funding to Indiana's loss of $60 million, in my estimate. Should a community of 800 send its sewage to Pigeion River because of neglect at other levels in the state structure?

Thank you.

Karen Griggs
RR1 Ashley
Indiana 46705

MR. MAYO: Mr. Purdy, are you prepared to go ahead with Michigan?

STATEMENT OF RALPH W. PURDY,
EXECUTIVE SECRETARY,
MICHIGAN WATER RESOURCES COMMISSION,
LANSING, MICHIGAN

MR. PURDY: Before starting on Michigan's report with respect to compliance with enforcement conference recommendations, I would like to preface my remarks -- since our report relates to the recommendations on phosphorus, in particular as it evolved from the Second Session of this conference on February 25, 1969 — with respect to phosphate removal, by quoting from the summary: "The conferees discussed modification of the recommendation established by the First Session of the conference that waste treatment be provided by all municipalities to achieve at least 80 percent reduction of total phosphorus. A basin-wide approach to phosphorus reduction was proposed whereby the States would determine where phosphorus removal would be required as long as an overall reduction of the 80 percent from municipal and industrial sources is obtained within the drainage basin of the respective States. To accomplish this, the States would estimate or compute their phosphate loadings and from this develop a program for a total phosphorus reduction of 80 percent. The States will report on their phosphorus reduction programs at the conference progress meetings to be called periodically."

Michigan did identify to this conference those municipalities with interim time schedules that would be required to remove phosphorus so as to meet the total basin requirement of 80 percent phosphorus reduction from the point sources.

The reports that have been given to this conference today, and the report of slippage relates to the program that was identified at that time. The report that I am giving today will report on how we are proceeding to make that 80 percent reduction, how well we have progressed on it, how much our slippage will be, and does not necessarily pinpoint those municipalities where we do have slippage.

We will continue in Michigan to control every source of phosphorus that we can to the maximum extent

R. Purdy

possible. A law that was passed to control the amount of phosphorus content of detergents on a statewide basis, since our last report to this conference, has aided our program in reaching the 80 percent total phosphorus reduction from all point sources.

The intent of my brief presentation is a report on Michigan's programs with regard to the issues raised by Mr. Mayo in a recent letter to me. These include the status of compliance of the individual dischargers with the phosphorus removal, combined sewers, disinfection and industrial waste control requirements of the Lake Michigan Enforcement Conference.

Also included — which we will discuss in greater detail at a later point — as requested, is a comparison of the conferees' March 25, 1971, recommendations regarding thermal discharges, along with Michigan's implementation of these recommendations and reasons for differences with certain sections of the recommendations. (See pp. 138a, 138b and 138c)

Michigan's programs with regard to the Technical Committee reports and their recommendations will be reported on at a later point in time.

Status of Compliance

In April 1972, the Michigan Water Resources Commission adopted a statement of its enforcement policy

ommendations of the Conferees at the Lake Michigan Enforcement Conference, March 25, 1971

In order to protect Lake Michigan, the following controls for waste heat discharges are concurred in by the conferees representing Indiana, Michigan, Wisconsin, and the United States Environmental Protection Agency. Municipal waste and water treatment plants, and vessels are exempted from these recommendations.

I. Applicable to all waste heat discharges except as noted above:

1. At any time, and at a maximum distance of 1,000 feet from a fixed point adjacent to the discharge, (agreed upon by the State and Federal regulatory agencies), the receiving water temperature shall not be more than 3°F above the existing natural temperature nor shall the maximum temperature exceed those listed below whichever is lower:

	Surface 3 feet
January	45°
February	45°
March	45°
April	55°
May	60°
June	70°
July	80°
ugust	80°
September	80°
October	65°
November	60°
December	50°

State of Michigan's Implementation of Lake Michigan Enforcement Conference Recommendations August, 1971

The Michigan conferee agreed by his concurrence to present the recommendations to the Michigan Water Resources Commission for their approval.

Mixing zones for thermal discharges will be established on a case by case basis and will be designed to minimize effects on the aquatic biota in the receiving waters and to permit fish migration at all times. Configuration will be based on the physical characteristics of the receiving water body and the biological importance of the area to be protected, such as spawning areas, migratory routes etc. Within mixing zones other standards than those presented may be applicable but will not interfere with the designated water uses for the area.

Lake Michigan shall not receive a heat load which would warm the receiving water:

a. More than 3°F above the existing natural temperature at the edge of the mixing zone nor;

b. to temperatures higher than those listed below at the edge of the mixing zone.

1. Lake Michigan north of a line running due west from Pentwater;

January	*40°*
February	*40°*
March	*40°*

Water intakes shall be designed and located to minimize entrainment and damage to desirable aquatic organisms. Requirements may vary depending upon local situations but, in general, intakes are to have minimum water velocity, shall not be influenced by warmer discharge waters, and shall not be in spawning or nursery areas of important fishes. Water velocity at screens and other exclusion devices shall also be at a minimum.

Discharge shall be such that geographic areas affected by thermal plumes do not overlap or intersect. Plumes shall not affect fish spawning and nursery areas nor touch the lake bottom.

April	*50°*
May	*55°*
June	*70°*
July	*75°*
August	*75°*
September	*75°*
October	*65°*
November	*60°*
December	*45°*

2. Lake Michigan south of a line running due west from Pentwater;

January	*45°*
February	*45°*
March	*45°*
April	*55°*
May	*60°*
June	*70°*
July	*80°*
August	*80°*
September	*80°*
October	*65°*
November	*60°*
December	*50°*

Water intakes shall be designed and located to minimize entrainment and damage to desirable aquatic organisms. Requirements may vary depending upon local situations, but in general intakes are to have minimum water velocity and shall not be in spawning or nursery areas of important fishes. Water velocity at screens and other exclusion devices shall also be at a minimum.

Discharge shall be such that geographic areas affected by thermal plumes do not overlap or intersect.

system construction schedule approved by the State regulatory agency and EPA. In all cases, construction of closed cycle systems an associated intake and discharge facilities shall be completed by December 31, 1974, for facilities utilizing natural draft towers and December 31, 1973, for all other types of closed cycle systems.

III. The States agree to file with EPA within six months a plant by plant program identifying corrective actions for the modification of intake facilities, including power plants, municipal, and industrial users, to minimize the entrainment and damage to desirable aquatic organisms.

IV. The Conferees agree that there should not be a proliferation of new power plants on Lake Michigan and that in addition to the above controls, limitations should be placed on large volume heated water discharges by requiring closed cycle cooling systems, using cooling towers or alternative cooling systems on all new power plants.

The Michigan Water Resources Commission has recently initiated a program to determine the significance of intake mortalities to fish and other aquatic life. Present studies underway at two existing facilities will also give a better indication whether intake structures are detrimental to aquatic organisms which pass through them.

Agreed to by the Michigan Water Resources Commission as a moratorium for a five year time period. Re-evaluation will be undertaken prior to end of five year period.

regarding communities required to follow corrective programs, but not receiving financial grants. The statement, as amended at the Commission's May 1972 meeting, reads as follows:

"Throughout the period of its operation, the Water Resources Commission has held to the position that the public's mandate, as set forth in State law calling for water pollution control, was not conditioned upon the availability of Federal grants to provide financial assistance in construction of the necessary projects.

"It is still the Commission's view that the pollution control program is intended to be advanced with all possible expedition.

"1. Since eligibility of a project for Federal (and State) grants is conditioned upon the completion of final plans, and since the cost of such plans is a relatively small part of the total project cost, the Commission will continue to pursue enforcement action through the plans-completion stage.

"2. The Commission will pursue enforcement action to attain timely conformance with phosphorus control requirements.

"3. Projects in which phosphorus control is proceeding timely, or in which the per capita cost of such removal is exceptionally great, and for which final plans are on file or proceeding timely, and for which Federal grant application is on file will be individually reviewed for further enforcement action.

"4. If there are situations in which the Environmental Protection Agency believes that it should proceed with enforcement action to establish the future scheduling of municipal performance dates, the Commission requests that it be made a party to those Federal proceedings so that it may be in the proper position to participate in the development of appropriate scheduling."

The table entitled, "Status of Compliance with Lake Michigan Enforcement Conference Requirements" contained in the Environmental Protection Agency's "Report on the Reconvening of the Lake Michigan Enforcement Conference, September 19, 1972," is essentially correct for Michigan's communities and industries as of August 3, 1972. Information on certain of the communities should be updated, particularly to reflect recent action on providing interim phosphorus removal facilities.

That action is appended to the State's report. I ask it be made a part of the record. I will not read it at the present time. (See pp. 141-143)

Disinfection

All Michigan communities are meeting the pro-

UPDATED INFORMATION ON THE STATUS OF COMPLIANCE OF COMMUNITIES IN THE MICHIGAN PORTION OF THE LAKE MICHIGAN BASIN

Albion - The City does not express a willingness to proceed with phosphorus removal until it receives a Federal grant. Plans and specifications have been received and approved.

Battle Creek - The Final Order for phosphorus removal was recinded at the August, 1972 Michigan Water Resources Commission meeting as the city is presently achieving 70 percent phosphorus removal. Phosphorus removal facilities will be required as Federal funds become available.

Big Rapids - Plans for interim phosphorus removal have been submitted.

Bronson - The City has not yet submitted plans. The matter will be brought to the Commissions' attention at the October, 1972 meeting.

Charlotte - Local financing is underway. The City has been requested to submit plans and specifications to provide interim phosphorus removal by December, 1972.

Delhi Township (Ingham County) - Authorization of plans for secondary treatment contingent upon the Commission not enforcing interim phosphorus removal facilities. They are awaiting Federal funds. The Township will report to the Commission at its September, 1972 meeting.

Dowagiac - A Show Cause Hearing has been scheduled for the September, 1972 Commission meeting.

Grand Ledge - The Commission concurs with staff recommendations and are holding in abeyance any statutory proceedings.

Grand Rapids - Phosphorus removal facilities are under construction.

Hartford - Purchases of equipment to provide interim phosphorus removal facilities have been made.

Hillsdale - Phosphorus removal facilities have been incorporated in tertiary treatment plant plans. The City is ready to begin construction, pending receipt of Federal funds.

Ionia - The June, 1972 Show Cause Hearing was recessed. The City does not plan to provide interim phosphorus removal facilities. The Commission is conferring with staff.

Iron Mountain - Kingsford - At the August meeting, the Commission told the City to study the feasibility of providing interim phosphorus removal facilities. The City is to report back to the Commission at its October, 1972 meeting.

Iron River - A new Stipulation, including new dates, will be prepared for a joint wastewater treatment facility.

Manistee - The City is to present a report on interim phosphorus removal to the Commission in September, 1972.

Manistique - Interim phosphorus removal facilities are required by December, 1972.

Marshall - Interim phosphorus removal facilities are not required by Commission action.

Updated Information on the Status of Compliance of Communities
In the Michigan Portion of the Lake Michigan Basin
PAGE 2

Mason - Authorization of plans for tertiary treatment are contingent upon the Commission not enforcing interim phosphorus removal facilities. The City is awaiting Federal funds. The Commission is conferring with staff. A Final Order of Determination has not been entered.

Niles - The City has been directed to provide interim phosphorus removal facilities by December, 1972.

Norway - The City has been requested to start interim phosphorus removal facilities and to report to the Commission at its October, 1972 meeting.

Otsego - Phosphorus removal facilities are incorporated in improved treatment plans. The City will start construction upon receipt of Federal funds.

Ovid - Plant completed in 1969.

Perrinton - A joint project with the Rainbow Lake Development Corporation and Fulton Township is under construction.

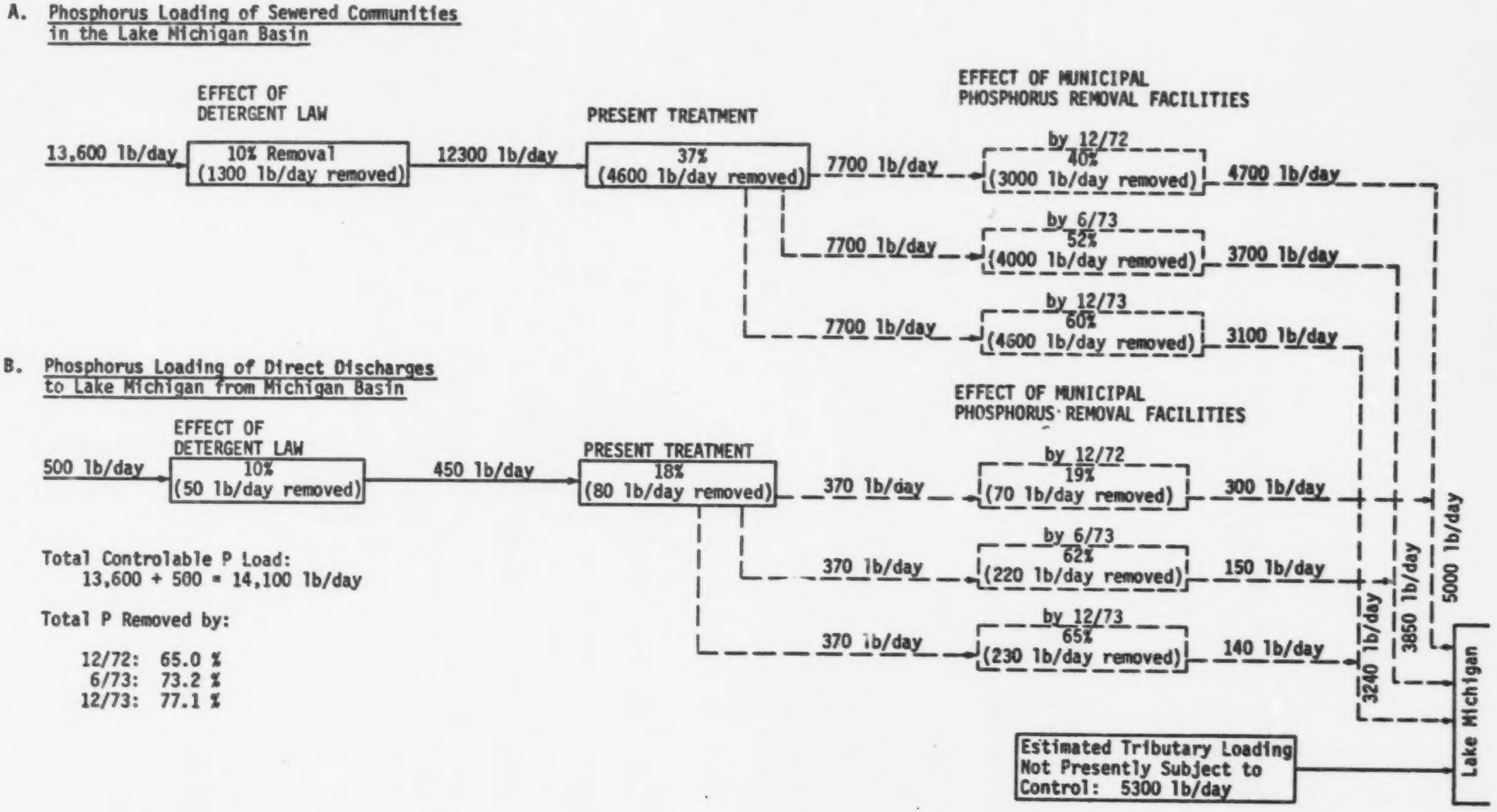
St. Johns - The project is behind schedule but it is believed that the completion date for phosphorus removal facilities specified in Final Order of Determination #1386 can be met. Plans for these facilities have been submitted to the Michigan Department of Public Health for their approval.

Whitehall - The north portion of the Muskegon County system has been under construction since May, 1971. Completion of the spray irrigation system is expected by December, 1972.

Wyoming - Construction is under way. This includes interim phosphorus removal facilities.

September 15, 1972

SCHEMATIC REPRE TATION OF PHOSPHORUS REMOVAL PROGRAM IN THE LAKE MICHIGAN BASIN


A. Phosphorus Loading of Sewered Communities in the Lake Michigan Basin
EFFECT OF DETERGENT LAW
13,600 lb/day
10% Removal (1300 lb/day removed)
12300 lb/day
PRESENT TREATMENT
37% (4600 lb/day removed)
EFFECT OF MUNICIPAL PHOSPHORUS REMOVAL FACILITIES
7700 lb/day
by 12/72 40% (3000 lb/day removed)
4700 lb/day
7700 lb/day
by 6/73 52% (4000 lb/day removed)
3700 lb/day
7700 lb/day
by 12/73 60% (4600 lb/day removed)
3100 lb/day
B. Phosphorus Loading of Direct Discharges to Lake Michigan from Michigan Basin
EFFECT OF DETERGENT LAW
500 lb/day
10% (50 lb/day removed)
450 lb/day
PRESENT TREATMENT
18% (80 lb/day removed)
EFFECT OF MUNICIPAL PHOSPHORUS REMOVAL FACILITIES
370 lb/day
by 12/72 19% (70 lb/day removed)
300 lb/day
370 lb/day
by 6/73 62% (220 lb/day removed)
150 lb/day
370 lb/day
by 12/73 65% (230 lb/day removed)
140 lb/day
5000 lb/day
3850 lb/day
3240 lb/day
Estimated Tributary Loading Not Presently Subject to Control: 5300 lb/day
Lake Michigan

Total Controlable P Load:
13,600 + 500 = 14,100 lb/day

Total P Removed by:

12/72: 65.0 %
6/73: 73.2 %
12/73: 77.1 %

visions of continuous disinfection for municipal effluents.

Combined Sewers

Three Michigan communities are listed in Table 5 of the EPA report as having combined sewer problems subject to the requirements of the Enforcement Conference. Additional problems are being identified and corrective action taken.

There are a number of additional communities that will have to be added to that list.

Summary of Grant Funding

Since 1968, a total of $113,459,449 in State and Federal grant funds have been made available to communities in the Michigan portion of the Lake Michigan Basin to provide wastewater treatment facilities and sewerage systems. Of this total, $69,430,306 has been provided by the State while $44,029,143 has been provided by the Federal Government.

This represents a total eligible project cost of the construction program of $113,459,449.

Chloride Report

July 1972, chloride loads show a total of 2,400,000 pounds per day discharged by the six identified point sources. This is a 42 percent reduction from the 4,100,000 pounds per day found in 1968. Completion of

R. Purdy

facilities to reduce chloride loads are expected to reduce the load to approximately 1,793,000 pounds per day by the end of 1972 and to 805,050 pounds per day by the end of 1973. The final figure represents an 80 percent reduction from the 1968 loads.

Phosphorus Report

The Enforcement Policy stated under Status of Compliance holds true for the December 1, 1972, goal of 80 percent phosphorus removal in municipal wastewater treatment plants. Despite the delays caused by inadequate Federal funding, Michigan has made substantial progress in reducing the phosphorus load to Lake Michigan. Of the estimated 19,400 pounds per day phosphorus loading from the Michigan portion of the Lake Michigan Basin, 14,100 pounds per day are from controllable sources. About 10 percent of this portion was reduced by the enactment of Public Act 226 of 1971, which prohibits the sale of cleaning agents which contain phosphorus in any form in excess of 8.7 percent by weight expressed as elemental phosphorus after July 1, 1972.

This reduces the controllable sources to 12,750 pounds per day. Present treatment facilities reduce phosphorus loads from sewered communities to tributaries of Lake Michigan by 37 percent and the phosphorus loads of direct discharges to Lake Michigan by 18 percent leaving a total of 8,070 pounds per day. This represents a 43 percent removal of the total controllable phosphorus loads. By December 1972, treatment facilities will be removing an additional 40 percent of the controllable phosphorus load to tributaries and an additional 19 percent of the controllable phosphorus load from direct discharges to Lake Michigan. Thus, the total load from controllable sources will be 5,000 pounds per day, a 65 percent reduction. By June 1973, this will be further reduced to 3,850 pounds per day, a 73.2 percent reduction, and by December 1973 it will be reduced to 3,240 pounds per day, a 77.1 percent reduction.

The remaining portion of this report deals with the thermal issue and intake facilities related to that and, therefore, I will report on that when this is scheduled on the agenda.

MR. MAYO: Any questions or comments, gentlemen?

Well, I have one question, Mr. Purdy.

In the review of the phosphorus report, on page 4, you indicated that by December 1973, your reduction will be in the magnitude of 77 percent of the controllable phosphorus sources.

Is it ever going to get to be 80 percent?

MR. PURDY: We only carried it out through 1973.

This indicates we are slightly over 1 year off in meeting the conference goals. We intend to meet the conference goals. In fact, we believe it is necessary to go beyond that.

MR. McDONALD: Mr. Purdy, you state on page 2, as part of your Commission's policy that: "The Commission will pursue enforcement action to attain timely conformance with phosphorus control requirements."

How many municipalities will not be in compliance at the end of this year? And what does your Commission plan to do to pursue this policy?

MR. PURDY: Well, I can't give you the number. There will be a number of communities though. We have initiated "show cause" hearings where it is obvious, at this point in time, that the community has not proceeded on a schedule to meet the December 1972 date.

Your Agency has been asked to participate in those "show cause" hearings, and you have participated in those. Where it is possible to add interim phosphorus removal facilities, our Commission has asked those communities to proceed.

In a number of instances, those communities are proceeding on an interim phosphorus removal program. Some will meet the December 1972 date. However, if they have not got something under way at this point in time they will not meet the December 1972 date.

In a couple of instances, now, we have communities that have stated that they do not intend to proceed on an interim basis. This will be reported to my Commission on Thursday and Friday of this week. What the Commission's action will be I can't predict at this point in time.

I certainly hope that the Commission decides to pursue this, as I think they will, as they have stated in their policy statement, and that they will refer those in the communities to the Attorney General for further enforcement action in the State courts.

MR. McDONALD: Well, in passing this resolution, was there staff discussion at that time when they came forth with this policy?

MR. PURDY: Yes.

MR. McDONALD: Was the thrust of that that the Commission would issue an order and refer the case to the Attorney General?

MR. PURDY: Yes, where it was possible to do this. In some instances, the present facilities are not capable of handling the increased solids load that will be generated from the chemical precipitation process even by, say, sanitary landfill, of those suspended solids, or those solids that are removed. And in those cases, the Commission is reviewing that on an individual basis, and they may not refer that one for a further enforcement action.

However, where it is determined by a preliminary engineering study that the present facilities are capable, with some slight modification, with the addition of chemicals, of removing a substantial portion of the phosphorus, it is the Commission's policy, as I understand it, to pursue that requirement vigorously.

MR. McDONALD: But where it is not technically feasible to go ahead, there will be no staff recommendation for an order, and that case would continue to get delinquent until such time as Federal funds and State funds became available?

MR. PURDY: If that community has final plans and specifications on file, and approved, and if that community continues to file an application for a Federal grant, I would then say that your statement is no doubt correct.

MR. McDONALD: So the solution of that particular problem would be open-ended, then, until funds were available?

MR. PURDY: Yes.

MR. McDONALD: Thank you.

MR. MAYO: Any further comments or questions, gentlemen?

Does Michigan have any other presentation?

MR. PURDY: I have requests from several that they would like to make statements. However, I believe most relates to the phosphorus question on an overall basis and on the thermal issue, and if I am wrong, I wish that the people that have notified me that they wanted to make statements would stand up now so that I could call upon you.

If not, you will be called later, at the time that this conference addresses the phosphorus technical report and the thermal issue.

I think that concludes it, Mr. Mayo.

MR. MAYO: May we go on with the Wisconsin report?

MR. FRANGOS: Mr. Chairman, it is now about 3:30, so what I would like to do, with your indulgence, is have appearances from those who requested to make statements relating to compliance status, at this point in time, and we will follow up with our statement. We don't have very many.

I do have a request from the city of Manitowoc to make a statement to this conference. Are those folks still here?

STATEMENT OF THE HONORABLE JOHN KREY, MAYOR, MANITOWOC, WISCONSIN

MR. KREY: Mr. Chairman, gentlemen. I do not have a prepared statement, but I do wish to give a report. In fact, the reason I am here, I am asking the conference to grant -- pardon -- Mayor John Krey from the city of Manitowoc.

MR. MAYO: Excuse me. Would you state your name and position, for the record, please?

MR. KREY: Yes. Mayor John Krey, K-r-e-y. I have been waiting so long to get up here that I forgot that. (Laughter)

But -- anyways I don't have a lot of facts and figures to give you people here -- but I do want to explain the situation in the city of Manitowoc. We are under orders from the Department of Natural Resources, as most of you desire, to provide phosphorus removal by December 31, 1972. Unfortunately we will not be able to meet this date for a varied number of extenuating circumstances.

I heard the mention that money should be no object, but unfortunately when you are in a smaller community and you go before the people that elect you, the taxpayers, every 2 years, money is an object.

The city of Manitowoc has progressed. We have been a leader of the field in the sewage treatment field. In 1940 we had our first plant. We added secondary treatment in 1959. We have a very good record, we think, as far as putting anything into Lake Michigan. We have been located there for 125 years, and we do feel that there are problems in Lake Michigan.

At the present time, we have had plans completed for the phosphorus removal equipment and trickling filter improvements. The plans were approximately completed in April of this year. We are in the present position of advertising for bids but, as you all know, this does take time in municipal government. We anticipate starting the project approximately November of this year. According to the specifications that we do have, it takes approximately 4 months to put in the phosphorus removal equipment. We do not plan, at the present time, to put in a temporary facility. This would be a duplication of cost, and for the time period involved, it would probably be within 30 days, if we did go to a temporary system.

One of the main reasons, of course, we have had plans for approximately a year; we have been working on it. The city back on April 6 did raise the money on a bond issue to tax the taxpayers of our city for an addition to our sewage treatment plant which, of course, would go along with the phosphorus removal, and updating of our trickling filter system.

We also planned on adding tertiary treatment. We do not feel that the 85 percent that is recommended by the State on removal of phosphorus will be standing for too long. We would think that it would be upgraded, and we want to be prepared for this. This is the reason why the tertiary treatment plans will also be drawn up. And, as many communities are aware, I probably wouldn't be standing here today if the funds were available for such project.

We seem to have the money people missing today. We have various departments that issue orders; we have the enforcement section that carries them out; but the communication to the people that raise the funds for these particular projects seems to be somewhat lacking.

Just to go into a little bit more detail, we have just signed up recently for an elimination of pure water study from our sanitary sewers. We have never had combined sewers so we do not have the problem that some communities do have.

Here again we are waiting for Federal funding.

We are also under orders from DNR to provide sanitary sewer service to an area recently annexed to our city approximately 2 years ago. It took us only 3 years to obtain a grant for this particular sewer project. We were just about all ready to go on the thing and then all of a sudden we got orders that until we update and complete our sewage treatment plant, we could put the sewers in, but we can't use them due to the fact that it would overtax the present facilities we do have.

There is pollution occurring in this particular area. One of the major contributors to it, at the present time, is taking a tanker truck and dumping their waste material into our sewage treatment plant at the present time. This is costing them a great deal of money. So it kind of makes you wonder if we are really interested in curing pollution or helping it somewhat. We do not feel, by the addition of this sewer system, that it would tax our plant any more than it is at the present time. It would be taking care of a particular problem, and helping out one of our local industries.

I guess maybe that is about all that I do have. Like I say, we aren't asking for an extension of time. We do have the plans; they have been approved. We are open for bids on it at the present time. Like I say, it is going to probably be about 3 months after the bids are awarded that the phosphorus removal equipment would be ready to operate in the city of Manitowoc.

We have an anticipation date of October of 1974 for the complete major improvements to our present sewage facilities.

Thank you.

MR. MAYO: Any comments?

Mr. Frangos.

MR. FRANGOS: No, I have no comments.

MR. McDONALD: Mayor, when is the phosphorus removal going to take place?

MR. KREY: We should have bid opening on this by October 31.

MR. McDONALD: And when would the phosphorus removal actually be in operation?

MR. KREY: Actually, according to the schedule we do have here -- we put an addendum to our contract that this would be of prime importance, and it would take approximately -- I would say right now it would be March.

MR. McDONALD: March.

MR. KREY: Right.

Thank you.

MR. PURDY: Mr. Chairman.

Mayor, on your combined sewer overflow problem, I think you mentioned that this is contingent upon Federal funding. I am sure that your residents support the general concept of clean water in Lake Michigan. But do you feel that you have the support of your residents to proceed on this project in the absence of any grant funds?

MR. KREY: I would doubt it very seriously, due to the fact that the amount involved is approximately $400,000.

MR. McDONALD: Do you mean there is a chance?

MR. KREY: Please?

MR. McDONALD: Do you mean there is a chance? You left a sight of hope there which surprised me. (Laughter)

MR. KREY: Well, I just like to tell it like it is. When you are in public office -- I am sure the gentlemen and ladies in the audience -- they know that when you go to the voters every 2 years, that if the tax rate gets too high unfortunately you won't be standing around here another 2 years. The mind is willing but the pocketbook isn't.

MR. McDONALD: If Mr. Purdy had told me in advance he was going to ask that question, I would have liked to put some money down on the answer.

MR. MAYO: Any other questions of the Mayor? Thank you very much.

MR. KREY: Thank you very much, gentlemen.

MR. MAYO: Mr. Frangos.

MR. FRANGOS: Yes, I also have a request from an official from the city of Racine. Do they wish to make a statement at this time? Is there anyone here from Racine?

MR. HOGANSON: We didn't intend to make a statement; we would just like to have our written report in the record. All we need is Federal money to finish our project. (Laughter)

MR. McDONALD: All I would say about Racine, Tom, is that Racine is tracking the EPA wherever we go in Wisconsin. Now I see they have come down to Chicago. (Laughter)

We had a 180-day hearing in Sheboygan and who was there in force but Racine -- (Laughter) -- and now we are down in Chicago and here is Racine again. So I think we are getting together here although they still won't talk. (Laughter)

MR. FRANGOS: Well, there may be some different considerations that have stirred the interest of the city of Racine.

I gather that they do want me to read their statement in the record and I will do that after I finish my statement.

MR. MAYO: You can either read it, or if you would like, we can have it introduced in the record as if read with the concurrence of the conferees.

MR. McDONALD: I for one would like to hear what they have to say.

MR. BRYSON: So that the record will not show a voice from the audience, will you please identify yourself, sir, for the record?

MR. HOGANSON: I am Lester Hoganson, City Engineer, city of Racine.

MR. BRYSON: Thank you.

MR. FRANGOS: Inasmuch as we have had a special request, do you want to read it, or do you want me to read it?

MR. HOGANSON: I would appreciate it if you read it.

MR. FRANGOS: All right.

Are there any other municipal officials or others that want to speak to the issue of compliance?

STATEMENT OF THOMAS G. FRANGOS, ADMINISTRATOR, DIVISION OF ENVIRONMENTAL PROTECTION, WISCONSIN DEPARTMENT OF NATURAL RESOURCES, MADISON, WISCONSIN

MR. FRANGOS: Mr. Chairman, conferees, I am Thomas Frangos, Administrator of the Division of Environmental

T. Frangos

Protection of the Wisconsin Department of Natural Resources.

As the conferee from Wisconsin, I will be reporting on the actions taken in our State to protect the waters of Lake Michigan, problems which may preclude full compliance with deadlines established at the First Session of the conference, and some of the new programs being implemented in Wisconsin to enhance Lake Michigan and all of the other waters under our jurisdiction.

As the Federal report indicates, there has been slippage in some phases of the program outlined for the four States at the First Session. It is important, however, that these shortcomings be kept in perspective. Much has been accomplished, and even more will be achieved within the near future. The Wisconsin effort at improving water quality throughout the Lake Michigan Basin (which encompasses roughly the eastern one-third of the State) includes these positive actions:

A) Of the 200 municipal waste treatment plants in the Lake Michigan Basin, 186 provide secondary treatment or are nearing completion of new secondary systems.

B) Since 1968 when the Enforcement Conference sessions began, there have been 69 pollution abatement projects completed in the basin at a cost of $60,804,818.

C) Currently, there are 36 projects under construction in the basin at a bid cost of $149,271,750.

D) An additional 15 projects have been certified for Federal grant-in-aid at an estimated cost of $42,087,500.

E) Plans and specifications have been approved for an additional 20 projects with an estimated cost of $25,440,808. These will be certified to EPA for Federal grant-in-aid as soon as Fiscal Year 1973 funds are allocated to the State.

In summary, Wisconsin municipalities in the Lake Michigan Drainage Basin have committed themselves to expenditures of $277,604,826 in the past 4 years. Another nearly $50 million worth of municipal pollution abatement construction is in the planning stage.

The 93 percent of municipal plants which provide secondary treatment of domestic wastes serve, in terms of population, approximately 97 percent of the residents of the Wisconsin portion of the basin who live in sewered communities. It is our goal to bring both figures to 100 percent by the middle of this decade -- not only in the Lake Michigan Basin, but statewide.

I cite these statistics to offset any misconceptions which may prevail regarding the substantial progress which has been achieved in control of water pollution. We are, in almost all instances, well beyond the critical stage of combatting gross pollution from uncontrolled discharges of raw human or industrial waste. We are concerned with the upgrading of systems which, through age or because of the growth of the community they serve, are at or beyond the level of optimum operating efficiency. As the topics on the agenda for discussion at this session of the conference clearly indicate, we are into the refined atmosphere of control of chemical pollutants -- phosphorus, pesticides, chlorides, and the rest. Without the base which has already been built in Wisconsin and elsewhere, we could not today afford the luxury of concentrating almost our full attention on these more insidious threats to a quality aquatic environment.

In reviewing the official record for the conference as compiled by EPA, I am also pleased to be able to make one additional announcement. Table 4, dealing with disinfection of municipal effluent, lists the city of Clintonville as one of the delinquents. Disinfection facilities at Clintonville were placed in operation on September 8, bringing Wisconsin municipalities in the basin into full compliance with this requirement. The conference report indicates that 11 of the 38 industries located in the Wisconsin portion of the basin are behind schedule in meeting ordered pollution abatement requirements. Seventeen are in compliance, and 10 are on schedule. This summary, while essentially accurate, does

T. Frangos

not reflect the more basic fact that almost all of those listed as behind schedule are committed to and relying upon the development of joint municipal-industrial treatment systems to achieve compliance.

With one exception, the industries listed as behind schedule are in the pulp and paper production field. It has been our experience that joint treatment is not only feasible but, in fact, enhances the waste reduction process. Highly carbonaceous pulping liquors, for example, are low in nutrients. Treated separately, they require the addition of phosphorus and nitrogen to support the biomass. Blended with domestic wastes, they utilize the nutrients in the sewage. The current operations of the Neenah-Menasha system -- which accepts a sizable volume of industrial effluents -- reveals that the uptake of phosphorus by the nutrient-starved industrial waste is achieving approximately 70 percent phosphorus reduction without the construction of special phosphorus removal facilities.

I offer this background material to support our conviction that it is wise public policy to encourage joint treatment facilities where practical and where the end result of an improved aquatic environment is anticipated. This does, however, complicate the enforcement effort which the conferees -- individually and jointly -- are engaged in.

T. Frangos

Many of the industries in the Fox River Valley are committed to projects with their municipalities and will not be in full compliance with Enforcement Conference requirements until the municipal systems are adequate to serve their special needs.

This leads us into the complexities of municipal system construction which the conferees, I am certain, are fully cognizant of but which may not be well understood by our citizens. Grant funds for municipal waste treatment construction are limited, at the Federal level, by congressional appropriation. They are also hemmed in by administrative regulations which, for example, require development of basin or regional or metropolitan plans acceptable to EPA and HUD and other Federal agencies. Treatment plant design parameters are likewise subject to scrutiny by EPA before grant money is allocated.

While I have no quarrel with the motivation for these several restrictions, they pose serious obstacles to the achievement of hard and fast deadlines such as those imposed by the conference. They strongly suggest the need for some enforcement flexibility since there are, in many instances, a myriad of regulatory detours which delay the process of moving from recognition of a municipal deficiency to its correction.

In Wisconsin, we have devoted extensive staff effort to meeting the planning requirements of the grant program. We have pressed existing regional planning agencies into service and have, in some instances, insisted on the retention of consultants where local capability was limited. Despite this effort, there are several projects within the Lake Michigan Basin which cannot today qualify for Federal funding even if such funds were available -- and they are not!

These comments are not made by way of complaint. EPA officials are, I am confident, as anxious to cut the red tape and get on with the task of building pollution abatement facilities as State agencies are. But the fact remains that we are all caught up in the web of competing goals and objectives, and that immediate progress is thereby often retarded.

Again, however, I want to emphasize that there has been considerable progress and that many of the objectives of the conference are being realized. Control of phosphorus discharges to the lake is one example.

The conference report indicates that 52 percent of Wisconsin's sewered population is in compliance with the phosphorus removal requirement. Since that report was compiled, we have reevaluated both existing compliance and what can be expected by the December 31, 1972, deadline. This leads us to these conclusions:

A) A 56 percent reduction in phosphorus tributary to municipal treatment plants in the Wisconsin portion of the basin is being achieved today, and this figure does not include the inherent (though admittedly small) removal efficiencies in conventional treatment plants.

B) By December 31 of this year, permanent phosphorus removal facilities will be removing 69 percent of the total phosphorus from municipal wastes -- and this figures does not include those communities which will be installing temporary (interim) facilities.

C) Assuming an 80 percent removal efficiency for those plants which will install interim facilities (85 percent is the ordered objective for permanent installations), total phosphorus reductions as of December 31, 1972, will amount to 81.2 percent for the basin as a whole, thus achieving the preliminary goal of the conference.

Of the 44 municipalities in Wisconsin ordered to install phosphorus reduction facilities, 4 are at or near the desired efficiency today. Statistically, 16 will have permanent facilities in operation by December 31; 20 will have temporary facilities on line; and 8 have not yet indicated to our agency whether they will meet the deadline. The picture with respect to phosphorus control is clearly much brighter than many of us would have predicted only a few months ago.

Since disinfection has already been discussed, I will close my comments with a brief statement regarding the status of sewer separation in Wisconsin communities. With the exception of Oshkosh and Oconto, municipalities in the upper portion of the basin should have no difficulty achieving sewer separation by the conference deadline of 1977. Earlier timetables have been set under State order for some communities, and within the next 18 months we anticipate that Green Bay, DePere, Kaukauna, Clintonville, Ripon, Shawano and Sheboygan will have their separation projects completed. Appleton and Oconto Falls have already met this objective.

In the lower portion of the basin, Port Washington has essentially eliminated its combined sewers. Milwaukee, Kenosha and Racine have demonstration projects under way which may provide alternative solutions to the problem which, in the older sections of these cities, is quite severe and difficult to correct through reconstruction.

The plan developed by the Southeastern Wisconsin Regional Planning Commission for the Milwaukee area recommends the construction of deep-tunnel storage for combined sewer overflows. During periods of wet weather the excess would be stored in these tunnels and, as treatment plant capacity permitted following the storm, would be pumped out for treatment. This is patterned after some of the proposals for the Chicago area. The city of Milwaukee has endorsed the plan and it is presently being reviewed by the Milwaukee Metropolitan Sewerage Commission.

Demonstration projects at Racine and Kenosha involve the concept of auxiliary treatment. In the Racine project, screening and air flotation units will be located at the sewer overflow outfalls. Additional activated sludge treatment units are being provided at the treatment plant site in the Kenosha project.

As the waste treatment plant improvement effort progresses -- and we believe adequate facilities can be provided in all instances by 1975 with the basin -- there is no doubt that greater emphasis can and must be placed on overcoming deficiencies within collection systems. Clear water intrusion remains a problem even where sewers have been separated, and the elimination of bypasses is essential.

The search for new ways to control potential pollution sources is continuing. Wisconsin, for example, has:

A) Achieved 100 percent concurrence by county units of government in the enactment of shoreland zoning ordinances designed to give special protection to areas

T. Frangos

within 300 feet of streams and 1,000 feet of lakes. Some areas unsuited for development are placed in conservancy zoning, and restrictions on construction are imposed elsewhere.

B) Established a solid waste licensing program which has resulted in closure of disposal sites where rubbish and garbage could be carried into surface waters, or where runoff or leachate might contribute to pollution.

C) Developed, in cooperation with farmers, agricultural specialists and other State and Federal agency officials, proposed animal waste regulations which would assist the agricultural community in solving some of the pollution problems associated with modern farming practices. These rules will be reviewed by the legislature early in the 1973 session.

D) Developed an industrial waste surveillance and monitoring program aimed especially at the reporting of toxic and hazardous materials.

E) Expanded the mercury surveillance program to require "materials balance" reports from those who utilize more than 50 pounds per year of metallic mercury or mercury compounds.

This, then, represents an overview of the status of Wisconsin's program for protection of the waters of Lake

Michigan. Although there will not be full compliance with the objectives of the conference by the stated deadlines, there clearly is movement on all fronts. Municipalities and industries have made tangible commitments to the extent that what is now required is the time to construct remedial facilities. The prognosis for filling the remaining gaps is good.

Mr. Chairman, that completes the prepared statement that we distributed to you.

I would like to read for your benefit -- and I apologize for not having copies, but I think this might be useful, for purposes of discussion -- and this is a policy statement adopted by the Wisconsin Department of Natural Resources in May of this year. And what I would like to read for you is a document that was the recommendation to our Board.

It is a motion with respect to pollution abatement in the Lake Michigan Drainage Basin.

The status of compliance with water pollution abatement orders issued to industries and municipalities in the Lake Winnebago-Lower Fox River complex has been extensively explored in recent weeks by the Department staff and the Environmental Quality Committee -- which is a committee of our Board.

T. Frangos

A public enforcement conference was conducted by the Department at Appleton on February 7 and 8. There were 22 major order recipients invited to this conference. Some of those who appeared indicated that they would be in compliance with the order deadlines, others might miss the completion dates by a few months, and still others were as much as 2 years off schedule.

It can be assumed that this area is representative of the Lake Michigan Basin as a whole. All of the communities and industries within the basin are faced with approximately the same time schedules since the Lake Michigan Enforcement Conference established December 31, 1972, as the target date for provision of adequate waste treatment for sources contributing to the pollution of Lake Michigan.

The Environmental Quality Committee has concluded that general policy direction should be provided to Secretary Voigt and the Department with respect to these orders, and that the recipients of the orders should be made aware at an early date what that policy position will be.

In summary, it is our determination that: 1) phosphorus removal can and must be provided by the ordered deadline of December 31, 1972, through installation of relatively inexpensive chemical feed equipment at existing treatment plants; 2) that punitive action should not be initiated against those entities who are proceeding in good faith but may miss other completion deadlines by a few months; and 3) that referrals to the Attorney General are appropriate where the slippage in abatement schedules will push the compliance date beyond July 1, 1973.

Therefore, the Environmental Quality Committee recommends, and I move adoption of, the following policy statement:

"It is the policy of the Natural Resources Board with respect to municipalities and industries within the Lake Michigan Drainage Basin that:

"1. Installation of phosphorus removal facilities will be required by December 31, 1972;

"2. That no more than a 6-month grace period be considered by the Department for those entities which can reasonably be expected to achieve compliance with other order requirements between January 1 and July 1, 1973;

"3. That those entities which cannot reasonably be expected to achieve compliance with the order requirements by July 1, 1973, be referred to the Attorney General for appropriate enforcement action."

That completes the resolution of the Wisconsin Natural Resources Board.

Mr. Chairman, I now have a statement by the city of

Racine. It is rather lengthy. I can either submit it for the record, or I can read it, as the conferees desire.

MR. MAYO: We have got some difficult time problems --

MR. FRANGOS: Right.

MR. MAYO: -- to address, Mr. Frangos. And with the permission from the city of Racine, I think it might be quite adequate to introduce the statement into the record as if read, and you can provide copies for each of the conferees.

MR. HOGANSON: That was our intention.

(The above-referred-to statement from the city of Racine follows in its entirety.)

(A letter from the city of Kewaunee received after the conference also follows.)

city of RACINE ...racine, wisconsin
OFFICE OF THE CITY ATTORNEY — Jack Harvey

September 18, 1972

Lake Michigan Enforcement Conference
September 19, 20 and 21
Chicago, Illinois

Re: Racine's 1972 Status Report of its
Pollution Abatement Programs

Gentlemen:

For the purpose of keeping the Conference posted as to the status of Racine's progress in its pollution abatement programs, there is furnished herewith the following data:

1. Statement of Gary K. Coates, Engineer-Manager of Racine's Water Pollution Control Division covering: a) the implementation of the expansion of the wastewater treatment plant which will enable it to remove in excess of 90 percent of the suspended solids and 5-day B.O.D., and 85 percent of the phosphorous present in raw waste water; b) the implementation of the City's program to handle Industrial Wastes; and c) the status of an ordinance establishing a sewer service charge.

2. Statement of Lester O. Hoganson, City Engineer covering the sewer separation program, including a Federal and State subsidized Environmental Protection Agency demonstration program to determine the feasibility of serving the last 13 percent of the City area without sewer separation by use of screening and air flotation treatment of combined sewer overflows.

3. Statement of Dr. G. P. Ferrazzano, City Health Officer, setting forth the implementation of a more intensive and continuing program of inspection and correction of possible sources of water pollution as they arise under the enforcement of our recently updated Health and Sanitation Code.

Despite serious financial obstacles and legal action being brought outside the administrative framework of this Conference, the City

730 Washington Avenue, 53403 City Hall 414-634-7111

of Racine is pursuing a course of pollution abatement that will not only meet time deadlines ahead of schedule, but which anticipates projected demands and will provide results that go beyond the present minimum demands of the Department of Natural Resources of Wisconsin.

It would seem to be an appropriate part of this report that the Conference be made aware of the fact that the City of Racine, along with several other cities in the southeastern Wisconsin are party defendants in a lawsuit being brought by the State of Illinois. The thrust of the litigation is to have a federal district court establish federal common law water quality and/or effluent standards for users of the waters of Lake Michigan. To date every request by this City, seeking to have the State and Federal Environmental Protection Agencies become involved in this litigation, has gone unheeded. The demands of the State of Illinois go well beyond anything that has been heretofore recommended by way of standards through the Conference. However, in the absence of participation by the State and Federal Agencies, it is entirely conceivable that standards can and will be established that supersede anything promulgated by the Conference route.

Very truly yours,

Edward A Krenzke

Edward A. Krenzke
Deputy City Attorney

EAK:lj

cc: Mayor Kenneth L. Huck

Enclosures

city of RACINE...racine, wisconsin
WATER POLLUTION CONTROL DIVISION — Gary K. Coates, P.E., Engineer-Manager

September 18 , 1972

To: Jack Harvey

From: Gary K. Coates

Subject: Lake Michigan Enforcement Conference - Statement on Compliance with Pollution Abatement Orders

I. Wastewater Treatment

A. Plant

As per the attached orders from the State of Wisconsin, Department of Natural Resources, the City of Racine, Wisconsin is to place in operation by December 31, 1972, facilities to adequately treat all waters tributary to the sanitary sewer system. Such treatment shall provide for a minimum of 85 per cent removal of the total phosphorus tributary to the wastewater treatment plant.

In complying with the above order, the City of Racine has taken the following steps:

1. On March 16,1970, the City of Racine signed a contract with a consulting engineering firm to prepare a report on the expansion of the city's wastewater treatment plant.

2. On November 17, 1970, the Common Council of the City of Racine approved said report and directed the consulting engineers to begin the preparation of the plans and specifications for the expansion of the wastewater treatment plant. (See attached Resolution)

3. On March 22, 1971, the City of Racine applied to the State of Wisconsin, Department of Natural Resources for both a Federal Aid Grant and a State Aid Grant for the proposed expansion of our wastewater treatment plant. (See attached applications)

4. The plans and specifications for the plant expansion program were completed and sent to the State of Wisconsin, Department of Natural Resources on January 17, 1972. The plans and specifications were approved by the Department of Natural Resources on February 28, 1972. (See attached approval letter)

2101 S. Main Street, 53403

5. The proposed enlarged wastewater treatment plant for the City of Racine is expected to remove in excess of 90 per cent of the suspended solids and 5-day biochemical oxygen demand and 85 per cent of the phosphorus present in the raw wastewater. The estimated construction cost is $8,000,000.00.

6. With the approval of the plans and specifications for the expansion of our wastewater treatment plant, the City of Racine is ready to immediately proceed with this project. In checking the various requirements before the project was advertised, the City was told that the Environmental Protection Agency would not review our plans because the Southeast Wisconsin Regional Plan Commission had not submitted a Drainage Basin Plan for our area. The City of Racine was also told that at this time there are no Federal monies available for the Grant-In-Aid Program. Therefore, until these above mentioned items are processed by the various agencies, the City of Racine will not be able to begin construction of the addition to our wastewater treatment plant.

B. Industrial Waste

As per Federal regulations in regard to Industrial Waste, the City of Racine has taken the following steps:

1. On May 6, 1969, the Common Council of the City of Racine adopted a Wastewater Control Ordinance which establishes what type of discharges can or cannot be directed to the wastewater treatment plant. This ordinance was adopted to prevent any detrimental waste from entering the plant and thus assuring the proper and efficient operation of the wastewater treatment plant. (See attached Ordinance)

2. The latest Federal Regulations also state that where industrial wastes are to be treated by a proposed project, an equitable system of cost recovery shall be in force.

3. On March 3, 1971, the City of Racine retained a consulting engineering firm to prepare a report and establish an equitable system of cost recovery for the capital and operational and maintenance costs for the collection and treatment of industrial, commercial and domestic wastes contributed to the City of Racine's wastewater treatment plant.

September 18, 1972

Jack Harvey

4. On September 13, 1971, the "Engineering Report on Establishment of User Charges for Wastewater Treatment" was completed and transmitted to the City of Racine. From this report a proposed ordinance was prepared for the establishment of a Sewer Service Charge. (See attached copy of proposed ordinance)

5. In February and March of 1972, Public Hearings were held concerning the adoption of the Sewer Service Charge Ordinance. It is anticipated that a Sewer Service Charge, which will meet all Federal Guidelines, will be in effect no later than December 31, 1972.

OFFICE OF THE CITY ENGINEER

MEMO

Date: September 18, 1972

TO: Jack Harvey

FROM: Lester O. Hoganson, P.E.

Subject: Statement of City's Status in Regard to Sewer Separation

Prior to 1935 the City, like most other cities in Wisconsin, relied on a combined sewer system to carry its sanitary sewage and storm water to the Waste Water Treatment Plant or Lake.

As a result of a sewer separation construction program begun in 1935 and the recent completion of the 1969 H.U.D. Program involving the construction of 1.5 million dollars worth of sanitary and storm sewers, all but 13% of the area in the City is now served by separate sewer systems.

At present a Federal and State subsidized EPA Demonstration Program is underway. This 2.077 million dollar project will determine the feasibility of serving the remaining 13% of the area by the use of screening and air flotation treatment of combined sewer overflows. This year a $250,000 project for separating a small portion of the business district will be completed.

During the time period when combined sewers were used in the City, it was required that roof downspouts be connected to the sewer. As the combined areas are separated, the individual property owners are required to disconnect their downspouts and direct the water onto the surface and thus into the storm sewer system.

The City of Racine will meet the requirements of the Department of Natural Resources order dated April 17, 1970, requiring separation by July 19, 1977. This will be accomplished by separation or by installation of combined overflow treatment units, provided that State and Federal Grants are continued at the present level of funding.

LOH

city of RACINE ...racine, wisconsin

DEPARTMENT OF HEALTH — G. P. Ferrazzano, M.D.

September 18, 1972

CITY OF RACINE HEALTH DEPARTMENT STATEMENT TO THE LAKE MICHIGAN ENFORCEMENT CONFERENCE, APRIL, 1972

MADISON, WISCONSIN

The Racine Health Department has continued to perform bacteriological surveys of the Root River and the beaches along the Lake Michigan shore.

During the past year special emphasis was placed on the evaluation of several small outfalls which discharge into the Root River.

Several properties on one street along the river were found to be discharging basement laundering and kitchen wastewater directly into the river.

Orders were issued to each of the property owners to install pumps and to discharge this wastewater into the sanitary sewer. All of the offending properties in this area have completed their hook-up to the sanitary sewer.

This program will be continued when the level of the river is reduced so that these small outfalls may be visible. We shall continue to work closely with the Waste Water Treatment Plant and the Water Pollution Control Division by providing them with professional laboratory support.

G. P. Ferrazzano MD

G. P. Ferrazzano, M. D.
Commissioner of Health

730 Washington Avenue, 53403 City Hall 414-634-7111

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

L. P. Voigt
Secretary

BOX 450
MADISON, WISCONSIN 53701

September 29, 1972

IN REPLY REFER TO: 3270

Mr. Francis T. Mayo, Regional Admin.
U. S. Environmental Protection Agency
Region V
One North Wacker Drive
Chicago, Illinois 60606

Re: Phosphorus Removal at Kewaunee, Wisconsin

Dear Mr. Mayo:

Last week at the phosphorus portion of the Conference, mention was made of the difficulties being experienced by a few of our communities in meeting the phosphorus removal requirements even with interim facilities by the December 31, 1972 compliance date.

An appearance was made by Mayor Krey of the City of Manitowoc indicating that phosphorus facilities are expected to be in operation there by March, 1973. Additionally, representatives of the City of Kewaunee appeared before the Department's Environmental Committee and Board on September 7, 1972 and specifically requested that we bring their case to the attention of the conferees. I mentioned this to you and indicated I would forward the correspondence on the matter to you for inclusion in the hearing record. The material is enclosed.

Very truly yours,
Division of Environmental Protection

Thomas G. Frangos
Administrator

Enc.
cc: R. W. Purdy, Lansing, Michigan
Perry E. Miller, Indianapolis, Indiana
Wm. L. Blaser, Springfield, Illinois

THIS IS 100% RECYCLED PAPER

CITY OF
KEWAUNEE, WISCONSIN

LORNA M. RUDIE, CLERK-TREASURER
KEWAUNEE, WIS. 54216 — PHONE 388-2670

September 7, 1972

Mr. Thomas G. Frangos, Adm.
Wis. Dept. of Natural Resources
Madison, Wisconsin 53701

Dear Mr. Frangos:

Thank you for your letter of August 25, 1972, granting our request to appear before the Natural Resources Board - Environmental Quality Committee - on Sept. 7, 1972 at 9:00 A. M.

If I may, I would like to present the letter addressed to you on July 20, 1972 and this letter and Clarification of Orders, as a part of our presentation to the committee.

At the outset, let me reiterate, the Mayor and Council are in complete accord with the ultimate program of pollution control and credit U. S. Senator Gaylord Nelson as a moving force in this program. The City of Kewaunee has been able to proceed with all of the orders from the D. N. R. with dispatch. In fact, we are informed the City was among the first in the state to have complete separation of sanitary and storm sewer along with the addition of a secondary sewage plant in 1968.

The circumstances in our city today differ materially from 1968 - the city is in financial difficulties. We are not seeking special favors, but we are of the opinion that the enforcement of the law and the entry of orders should be tempered by the circumstances of the community involved. Further, an order based upon an actual evaluation of the community's financial capability and other pertinent facts does not establish a precedent for "Carte blanc" waiver of orders for other communities not similarly situated and therefore a waiver of the order for installation of temporary phosphorus removal facilities is proper under appropriate circumstances.

The $10,000.00, which is the engineer's estimate for temporary facilities, may seem like a minimal amount but with our 1972 budget and assessed valuation of $19,430,875.00 and $39.00 tax rate, this would represent an increase of 52¢ per M of assessed valuation or approximately $3.50 per resident. The school budget for 1973 has increased substantially and city's share has increased $43,907.00 representing another $2.25 per M tax rate increase which does not include Vocational School and County taxes, and City and Sewage Disposal operation costs. The 1972 assessed valuation of the city has increased $599,000.00, to $20,029,875.00 which is not very substantial and the $39.00 tax rate will certainly be increased. This creates a hardship as we have approximately 25% retired and fixed income people residing in the city.

The present status of city finances is as follows:

1. Equalized Value of City - $23,397,800.00 - Borrowing Auth. -		$1,169,890.00
2. Indebtedness:		
Fire Station Gen. Obligation Bonds ------	8,000.00	
Promissory Notes (Renewed in 1971 as we were unable to pay) ------------------	35,000.00	
Corp. Purpose Bonds of 1967 -------------	560,000.00	
Total Indebtedness	603,000.00	603,000.00
3. Total Borrowing Capacity ------------------------------------		$ 566,890.00
4. Projects pending in 1972 and not budgeted for:		
Orders from D.N.R. to close present land fill site by Oct. 1, 1972. (Probably be forced to request extension of time) -----------------	35,000.00	
Consulting Engineer's budget overdrawn as of August, 1972 ---------------------	13,605.04	
Contract - San. Sewer, Water Main & Storm Sewer Project (Request from developers for opening new addition for nursing home ---	53,537.30	
Environmental Assessment Report - Approx.	3,500.00	
Estimate by State for State Income Tax @ $35.00 per capita in July - $85,036.00- received $28.09 per capita or $68,482.17 Temporary borrowing before Dec. 1972 ---	20,000.00	
5. Approx. total expenditures for balance of 1972 ---------------------	125,642.34	125,642.34
6. Present Borrowing Power -------------------------------------		$ 441,249.66
7. Monies have to be provided before any contracts are signed.		
8. Future costs as ordered by D.N.R. cost of additions to Sewage Plant for 85% phosphorus removal ------------------	404,500.00	
Clear Water Report - Relays & Repairs, not including Engineering and Inspections (Expended to date - $47,000.) Balance --	227,419.25	
9. Total *must* expenditures --------------	631,919.25	631,919.25
10. Over and above borrowing power --------------------------		$ 190,669.34

11. City should retain borrowing capacity in case of emergency

12. Deficit in city operations in 1972 in accordance with the current audit report is $40,000.00.

The sources of phosphorus in Kewaunee are primarily domestic and retail business. The industrial wastes are principally non-organic, since our industries are principally in steel and metal fabrication. We have no canning, milk processing or like industries which would use large quantities of detergents.

Our consulting engineers advise that the raw sewage concentration during a 48-hour sampling program in October of 1970 was 12.0 mg/1 for the first 24-hour period and 10.5 mg/1 for the second 24 hours. They further advise us that a 12 mg/1 content is the norm for domestic sewage. For the 24-hour period that the raw sewage concentration of phosphorus was 10.5 mg/1, the raw sewage concentration would adjust to a population equivalent of slightly over 2500 people. Under the existing law Kewaunee would be excluded if the population were 2500 people.

Our engineers further advise that since the September and October tests, engineering corrections and operational corrections were made at the disposal plant so that the efficiency increased substantially.

Since we are now entering the cold weather season, the installation of a temporary phosphorus removal equipment will not have serious impact upon Lake Michigan. Our engineers and chemists advise that the nutritional effect of phosphorus on the lake water when cold is very small.

Our engineers further advised we can reasonably anticipate the sewage facility to be in operation in October, 1973, as had been previously reported in our letter of July 20, and thus phosphorus removal will be delayed approximately nine months if the order is amended by removal of the December 31 deadline.

The City will direct the consulting engineers to procure the installation and operation of the phosphorus removal equipment as a first priority in construction.

We are confident that our phosphorus wastes included in the raw sewage concentration with our population, is substantially below many communities with less than a 2500 population, and that as such the order unfairly discriminates against the City of Kewaunee, in addition to placing an unbearable financial burden upon us. If any further data or information is necessary, we will be happy to provide the same upon being advised.

Thank you kindly for the opportunity to appear and for any suggestions you may have to resolve our problem.

Sincerely,

Lorna M. Rudie
City Clerk-Treasurer

P.S. During a telephone conversation with our engineers after this letter was completed, we were advised that the $10,000.00 estimated cost of temporary facilities has increased to a minimum cost of $12,000.00, and this of course increases the impact upon our residents as explained in the earlier paragraph.

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CITY OF
KEWAUNEE, WISCONSIN

LORNA M. RUDIE, CLERK-TREASURER
KEWAUNEE, WIS. 54216 — PHONE 388-2670

CLARIFICATION BY THE CITY OF KEWAUNEE

Orders from D. N. R. dated Dec. 15, 1970

The City of Kewaunee was denied an extension of time by letter from the D. N. R. on October 28, 1971 for the reason that there was considerable slippage under item 2, 3, and 5 of the D. N. R. order. To properly explain this, the various paragraphs of the order and comments by the city follow:

Order: 1. That the City of Kewaunee place in operation by Dec. 31, 1972 facilities to adequately treat all wastes and waters tributary to the sanitary sewer system and inform this Department of such action. Such treatment shall include provision for a minimum of 85 percent annual average removal of the total phosphorus tributary to the treatment plant.

Comment: See letters attached.

Order: 2. That the City of Kewaunee submit by March 31, 1971 a preliminary engineering report for the required sewage treatment facilities.

Comment: This report was mailed and received by Mr. Frangos' office, D. N. R. on March 30, 1971. The Engineers' report was not satisfactory as per letter received from D.N.R. to Engineers dated May 26, 1971, approximately 2 months later.

Order: 3. That the City of Kewaunee submit by August 31, 1971 plans and specifications for the construction of the required sewage treatment facilities.

Comment: The Consulting Engineers informed us that it was impossible to present plans and specifications for construction of sewage treatment facilities until they received the results of the clear water inspection report. We believe orders of the D.N.R. should have been reversed.

Order: 4. That the City of Kewaunee by March 31, 1972 initiate construction of the required sewage treatment facilities.

Order: 5. That the City of Kewaunee submit by June 1, 1971 an engineering report and time schedule for the elimination of excess clear water from the sanitary sewer system. Such report shall update the existing clear water exclusion program and provide for the elimination of extreme clear water flows by December 31, 1972.

Comment: This physical inspection was done with the help of the city crew and under contract with the Engineers. Work on this project commenced in February, 1971, and due to frost - many springs in city and effects of melting snow - we encountered delays but the physical investigation was completed in May, 1971 and data resulting from the investigation was evaluated by the Engineers and was mailed on November 15, 1971.

On August 20, 1971, Letter from Bruce Bondo, Acting Chief, D. N.R., to the Consulting Engineers advising them to request for extension of time.

Sept. 2, 1971 - Request for extension of time submitted by the city.

Oct. 28, 1971 - Request denied by D.N.R..stating there was considerable slippage under items 2, 3, and 5 (Clarifications as noted).

We realize that both the D.N.R. and our Consulting Engineers have been very, very busy but we are completely dependent upon our Consulting Engineers and were not concerned about costs of additions for 85% phosphorus removal as we were informed that costs would be minimal but cost of chemicals would greatly increase. Our first cost estimate for construction was $238,000.00. Upon completion of final plans and specifications as late as June 26, 1972, the costs increased to $404,500.00 plus $10,000.00 for temporary facilities, plus cost of environmental assessment report approximately $3500.00. For the foregoing, and the reasons stated in our other material submitted including the July 20 letter wherein the request was initially submitted, we request waiver of the installation of the temporary facilities.

Lorna M. Rudie

Lorna M. Rudie
City Clerk-Treasurer
City of Kewaunee

LMR:as

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CITY OF
KEWAUNEE, WISCONSIN

LORNA M. RUDIE, CLERK-TREASURER
KEWAUNEE, WIS. 54216 — PHONE 388-2870

July 20, 1972

Mr. Thomas G. Frangos, Admn.
Wis. Dept. of Natural Resources
P. O. Box 450
Madison, Wisconsin 53701

Re: Wastewater Treatment Plant
City of Kewaunee, Wi.
DNR Order No. 4B-70-9-1

Dear Mr. Frangos:

This is to confirm our telephone discussion yesterday, July 19, 1972, and to comply with your request to submit in writing the facts which I presented to you over the phone. You also stated that if construction of the above referenced project could be completed by October 1, 1973, and the city requested for an extension of time, it would not be necessary to construct temporary phosphorus facilities and that it would be very beneficial if I would attend the Region 5 meeting in Chicago on September 19, 20 and 21.

At our Council meeting on June 26, 1972, our Consulting Engineers, Donohue & Associates, Inc. presented plans and specifications for the construction of proposed additions and alterations, for phosphorus removal to the existing wastewater treatment plant at a cost to the city of approximately $400,000.00, including engineering. Since we are unable to meet construction deadlines for phosphorus removal by December 31, 1972, the temporary facilities would cost the city an additional $10,000.00, which represents an additional cost of almost $4.50 per resident (not taxpayer) for a temporary facility. At the present time our borrowing capabilities are approximately $450,000.00. The Mayor and Council are therefore very desirous of avoiding the additional expenditure of temporary phosphorus removal facilities and directed that I contact the various departments to determine whether the deadlines could be extended to coincide with State and Federal funding and to eliminate the additional cost of temporary phosphorus removal facilities.

On June 29, 1972, I called U. S. Senator Gaylord Nelson to inquire as to the status of Federal funding grants. A copy of his letter is enclosed. I also called Mr. Louis J. Breimhurst, P.E., Director of the U. S. Environmental Agency, Region 5. He mentioned the fact that there would be another meeting called for Region 5 - Minnesota-Wisconsin District, and that it would be advantageous if Kewaunee could be represented. He also suggested I call you and present the city's problem.

At the outset, the city is in complete accord with pollution abatement and we have been diligent in complying with all DNR orders, including complete separation of sanitary and storm sewers, and a secondary waste treatment plant constructed in 1968. According to the latest census figures - the population of the City of Kewaunee is 2901, which is slightly over the 2500 population equivalent which is the break point for phosphorus removal requirements.

In review - the plans and specifications for the proposed additions and alterations to the existing wastewater treatment plant were mailed on June 27, 1972 to the Dept. of Natural Resources and are waiting approval from the Dept. of Natural Resources and the Environmental Protection Agency. Application for grants have been made and we have ordered the consulting engineers to complete the necessary Environmental Assessment Report which will be required before the DNR can process applications for wastewater treatment facility grant-in-aid programs, which was an added policy requirement recently issued. In discussing the completion date of construction with the engineers, as suggested by you, they advised us that if approval of plans and the processing of federal funding for this project follow the normal time schedules, it would be possible to have the plant under construction and completed by October 1, 1973. They also stated that if the city is unable to get a waiver for temporary phosphorus removal facilities, we would be required to notify them before August 15, 1972 so that plans could be submitted to the DNR for approval.

Considering all of the facts, and since the permanent phosphorus removal facilities will be in operation in 1973, we respectfully request that the requirement for the construction of temporary phosphorus facilities by the City of Kewaunee by December, 1972 be waived by the Department of Natural Resources.

Thank you sincerely for taking the time to listen to our "dilemma" over the phone and early consideration of this request will be greatly appreciated.

Sincerely yours,

Lorna M. Rudie

Lorna M. Rudie
City Clerk-Treasurer

LMR:as
Enc. - Copy letter from U.S. Sen. Nelson
C.C. to: - U. S. Senator Nelson
Mr. Louis J. Breimhurst, Director, E.P.A.
Donohue & Associates, Inc.

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HARRISON A. WILLIAMS, JR., N.J., CHAIRMAN
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STEWART E. McCLURE, STAFF DIRECTOR
ROBERT E. NAGLE, GENERAL COUNSEL

United States Senate
COMMITTEE ON
LABOR AND PUBLIC WELFARE
WASHINGTON, D.C. 20510

June 30, 1972

Ms. Lorna Rudie
City Clerk
City of Kewaunee
Kewaunee, Wisconsin 54216

Dear Lorna:

This concerns your phone call regarding the application of Kewaunee for a sewage treatment plant.

According to Mr. Robert Benson in the Municipal Waste Treatment Office of the Department of Natural Resources (608-266-0858), the preliminary report submitted on January 6th was approved. Presently, Mr. Benson's office is awaiting the plans and specifications for the plant from the engineers, Donahue and Associates. No further processing can be done until these are received.

There are no funds available at present because Congress has not yet appropriated them for the Environmental Protection Agency. The Appropriations Subcommittee will begin marking up the bill on July 19th.

The Department of Natural Resources has about 65 other applications awaiting funding. However, the plans and specifications should be submitted so that when funds become available, the application can be considered for funding.

If this office can be of further help in any way, please be sure to let us know.

Sincerely yours,

Gaylord Nelson

GAYLORD NELSON
U.S. Senator

GN:jh

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United States Senate
COMMITTEE ON FINANCE
WASHINGTON, D.C. 20510

August 22, 197

Mrs. Lorna M. Rudie
City Clerk-Treasurer
City of Kewaunee
Kewaunee, Wisconsin 54216

Dear ~~Mrs. Rudie~~ Lorna

Thank you for sending me a copy of your letter of July 20 to Mr. Frangos advising that the plans and specifications for proposed additions and alterations to the existing wastewater treatment plant were mailed on June 27 and requesting that the requirement for construction of temporary phosphorus facilities by December 19[illegible] be waived.

I have asked Mr. Frangos to send me a copy of his response to you. When it is received, I will be writing you further.

It is always a pleasure to be of service.

Sincerely yours,

Gaylord
GAYLORD NELSON
U.S. Senator

GN:jh

8/25/72

Dear Mr. Frangos,

Sorry to keep "bugging" you but time is of the essence. I have not heard from your office as to my request or whether we might meet with you or your Committee on Sept. [illegible]th. The Engineers requested the Council to authorize them to submit plans for temporary facilities and Dec., 1972, deadline does not give us much time, and certainly we can not afford a fine.

I realize that you are a very very busy man, but could you please consider our request.

Sincerely yours,

Lorna M. Rudie
City Clerk-Treas.

Reproduced from best available copy.

MR. FRANGOS: That completes our statement.

MR. MAYO: Any comments or questions, gentlemen?

MR. McDONALD: Mr. Frangos, I would like to commend you for a really clear, forthright statement. I think this lays out the position of the State of Wisconsin, both from a policy standpoint, and from an accomplishment standpoint, with a minimum of words and a maximum of clarity; and it certainly drives the point home of where you stand.

In particular, I think the policy of your Board, with its forthright statement, and then the subsequent communication to the municipalities involved, must have been part of the reason why things started happening this summertime and early fall in Wisconsin on phosphorus removal.

Is that part of the reason, in your estimation, why, since the issuance of the EPA status report, when we showed some 32 communities behind schedule, that now you say that at the end of December, all but 8 will be providing either interim or permanent phosphorus removal?

MR. FRANGOS: I think that is certainly part of it. I think also the activities of your Agency, either directly or indirectly, have also been helpful, in terms of making the point that we are very serious about this.

Now, I would say that these are commitments that have been made to us by these communities, and these commitments involve the ordering of equipment, and everybody is going like hell -- if you will pardon the expression -- so, once it is installed by December 31, 1972, we can't speak with 100 percent certainty as to quality -- but what I am saying is that they have given us the commitment so that there is movement, and they are proceeding on a crash program to reach interim removals by that date.

MR. McDONALD: In regard to the 8 that have not indicated to your agency whether they will meet the deadline, are you waiting for responses from them, or what is the next move in that situation?

MR. FRANGOS: Well, I think it will vary, depending on the circumstance. I think we have got a situation similar to those that Mr. Purdy discussed in Michigan. For example, the city of Kewaunee has told us that they aren't very much interested in moving forward with an interim program because they have a full expansion program that would put them on line in September of 1973. So we are negotiating this issue right now. But I think it is one of these things we are going to have to make an individual decision on.

MR. McDONALD: Well, on the 8 that you mentioned, are there terminal dates for phosphorus removal on those 8 or is this still open-ended?

MR. FRANGOS: They all have been issued the orders by our agency. So they are under order to secure this. Now, if they don't meet the deadline, then they are in technical violation of the order. The next route would be referral to the Attorney General's office.

Now I believe that we may have some requests for extension. We do have the authority to grant those extensions, if they are received in a timely fashion before the deadline. That relates, I think, to the policy. Our policy direction that we have got indicates that if there may be as much as a 6-month delay, if indeed it looks like there is going to be performance, then we do have that latitude to extend without referral.

MR. McDONALD: For the record, do you have a list of the names of all of the communities where the EPA report ought to be changed?

MR. FRANGOS: Well, we have those, I think -- a list of those that -- we haven't heard from the 8 -- I think that they could change their list.

MR. McDONALD: Can we have that --

MR. FRANGOS: It's my understanding it has been given to your fellows as a followup to the discussion we had this morning to update it.

MR. McDONALD: I have one other question in regard to the industrial side. Your statement indicated that all of the industrial delinquencies are attributable to hooking in or negotiating with municipal entities?

MR. FRANGOS: I think I said nearly all.

MR. McDONALD: Nearly all.

MR. FRANGOS: We do have that data available.

Do you want to know which one isn't; is that the question? I am sorry.

MR. McDONALD: No, I just wanted to clarify: Is that right, that this is the bulk of them. They are all negotiating with municipalities except for one.

MR. FRANGOS: Mr. Williams maybe can comment on that.

MR. WILLIAMS: One is not quite accurate. One is not pulp and paper industry. Anaconda American Brass Company in Kenosha is not pulp and paper.

Two of the pulp and paper industries have indicated that they will proceed on their own; one being Appleton Papers at Combined Locks; the other, Scott Papers at Marinette.

The balance are expected to tie in, in some way at least, with portions of their waste to municipal facilities.

MR. McDONALD: Are there contracts with each of those, Mr. Williams, between the paper mills and the municipalities at the present time?

T. Frangos

MR. WILLIAMS: I don't believe all of the contracts have been signed. They are being negotiated at Neenah-Menasha, at Appleton, and at Green Bay.

MR. McDONALD: Thank you.

MR. BRYSON: Mr. Frangos, I have a question. On page 6 of your statement, where you were talking about the combined sewer problem in the city of Milwaukee, would you clarify for the conferees who has responsibility for that plan? Is it the city of Milwaukee, the Milwaukee Metropolitan Sewerage Commission, or the Southeastern Wisconsin Regional Planning Commission?

MR. FRANGOS: Well, that is a good question, Mr. Bryson. It is a rather complicated structure in the Milwaukee area. Actually the responsibility is shared depending on what part of the system.

The Planning Commission, as part of its activities, has developed a water quality plan -- a detailed one -- for the Milwaukee River watershed, which represents a major portion of the area that has the overflow problems. Actually we have issued orders to the Commission, to the city, and also to a number of outlying suburban communities that are served by contract in that area, so it gets to be a little bit tangled. In other words, a community, whose collection system has either thermal problems or infiltration problems, or some other problems, has received an order even though, at a given point, the system is picked up by the metropolitan system.

But we have not been completely satisfied with the movement in that area, and we share the same concern that Mr. McDonald expressed about this program. Quite candidly we see that as the major problem, at this point, in the Milwaukee area.

MR. BRYSON: When we approach 1977, if nothing is done in that area to control the problem, who do you point the finger at for not having done what they should have done?

MR. FRANGOS: Well, I think it depends on what hasn't been done. We would be pointing a number of fingers, I think, at that point in time. But we are waiting to see if anything positive comes out of this issue at this meeting. If not, then, we are prepared to move into that area, hold some public hearings, and become more specific on the projects, such as I think your Agency has suggested at a meeting of this conference.

We are concerned that we have just got an outside date, even though our orders do require a plan, we have not had a detailed plan come forward to our satisfaction. As you know, once you have got a plan, you have still got to follow through on it.

MR. MAYO: Are there any other comments, gentlemen?

There is one observation I would like to make, and that is that water pollution control administrators on a national basis have been faced with the challenging problem of how to handle the combination of circumstances where industries and municipalities are prospectively going together in regional systems. I think there have probably been hundreds and hundreds of examples across the country where this has been used as a device to delay the decision-making process. Certainly we ought to be at a point in time where we just can't afford to tolerate that any longer. We have just got to keep the heat on the industrial establishments and the municipalities to press them into formal agreements to do something: formal agreements for treatment, for acceptance of wastes, for delivery of services. And unless we continue to press, we are just going to let ourselves continue to be deceived, and invite opportunities for protracted discussion, and limited opportunities for wastewater quality improvement.

I think some of the comments that we have gotten here today point up the need to be determined in our efforts to press for those agreements and press for solid dates for moving ahead and getting the job done.

MR. FRANGOS: I am not sure I would agree entirely with your premise, but I certainly agree with your conclusion. (Laughter)

MR. MAYO: Are there any other comments?

Now there were indications that there was a desire to make some public statements at the conclusion of the State presentations on the status of compliance, at least by the Businessmen for the Public Interest.

Are there any others in addition to BPI?

MR. BLASER: I have three more here in Illinois.

MR. MAYO: You do.

MR. BLASER: One is James Griffith, Committee on Lake Michigan Pollution, 3 minutes; and Businessmen for the Public Interest requested 5 minutes for its report; Paul Oppenheimer, Hyde Park-Kenwood Community Conference, Chicago, Illinois, 3 minutes; and Eileen Johnston, 2 minutes.

MR. MAYO: Do you have a particular order in which you wish to proceed?

MR. BLASER: David Dinsmore Comey is up front. Mr. Comey is representing Businessmen for the Public Interest. He wants to make a statement on the status of compliance and also on thermal pollution.

MR. MAYO: I think the thermal commentary may be out of order, Mr. Blaser, and I would make that observation to Mr. Comey.

The way the Chair would like to proceed: I think it would be appropriate to have whatever additional comments need to be directed to the status-of-compliance portion of the program concluded. Then we can take a brief recess, during which I want to discuss with the conferees the extent to which we might reasonably pursue the first day's agenda this afternoon. I would like to get us through at least Item 3 on the agenda today, dealing with the phosphorus problems.

Mr. Comey.

STATEMENT OF DAVID DINSMORE COMEY,
DIRECTOR OF ENVIRONMENTAL RESEARCH,
BUSINESSMEN FOR THE PUBLIC INTEREST,
CHICAGO, ILLINOIS

MR. COMEY: My name is David Dinsmore Comey. I am the Director of Environmental Research of Businessmen for the Public Interest. I was not planning to make a statement on thermal criteria today.

Briefly, I wanted to request that the conferees incorporate into the record, as if read, a 14-page document that I have put before the conferees, entitled, "Lake Michigan Major Industrial Polluter Inventory."

D. Comey

Let me describe how the document was prepared. For the last year, we have had an intensive review program of the applications on file with the U.S. Army Corps of Engineers for permits under the Refuse Act permit program. These applications are the only industrywide source of data on discharges, and we found it a rather useful exercise in order to get some idea of how much pollution was going into Lake Michigan and its tributary waters to investigate the 678 dischargers who have applied for Refuse Act permits.

We have done immense amounts of calculations in order to subtract intake concentrations from outfall concentrations, so as to arrive at the net figure that each facility is adding to the waterway, and then to screen major polluters out from minor polluters.

The result of this calculation and inventory is this document in which 111 facilities are listed.

I have put a 1-page caveat at the beginning indicating where I think one must exercise caution in using the inventory. I would say that I do believe these 111 facilities are responsible for approximately 90 percent of the pollution of Lake Michigan and its tributary basin. And to the extent that abatement can be achieved on the rather high levels among these polluters, I think the lake will be in a much better position from an ecological point of view.

We have not included some facilities which are already going to a municipal treatment system, since the applications were filed with the Refuse Act permit office. We have included a few facilities which, by the end of this year, are scheduled to be nondischargers. For example, Cities Service Oil Refinery is going to be closed up. S. T. Warren Paper Company, Division of Scott Paper, in the Muskegon area, is going to tie in with the Muskegon County Project. There are others.

In calculating this list of the "dirty 9 dozen" we have compared it with the number cited in the Status of Compliance list that was handed out by the Lake Michigan Enforcement Conference, and have noted that there are some 43 of the dischargers on our list which are not part of the Lake Michigan enforcement schedule of compliance.

I have typed up on a separate page this list. We neglected to include Allied Chemical under the State of Illinois.

At the end of this morning's session, there was a brief colloquy with Mr. Blaser of the Illinois EPA. Let me explain why we have included Republic Steel and Wisconsin Steel and Allied Chemical.

For the past two summers, we have floated paper boats on the Calumet River above the O'Brien Locks, and it is our feeling that it is not really true that the Calumet River flows steadily southward away from the lake. We think most of the time it doesn't flow at all, and when you have a half an inch of rain or more, it can go northward, and I have a lot of aerial photographs indicating precisely that. I realize this is a bone of contention that has been going on since the 1967 conference, but I think a good case can be made that anything north of the O'Brien Locks should be considered to be a part of the lake.

I suppose that there will be some questions asked as to why many of these other facilities -- particularly in the State of Michigan -- are not part of the Lake Michigan Enforcement Conference list.

Thank you very much.

(Mr. Comey's report follows in its entirety.)

BUSINESSMEN FOR THE PUBLIC INTEREST

DAVID DINSMORE COMEY
DIRECTOR OF ENVIRONMENTAL RESEARCH

SUITE 1001
109 N. DEARBORN ST.
CHICAGO, IL 60602
TELEPHONE 312-641-5570

1 November 1972

Ms. Janet Mason
Environmental Protection Agency
1 North Wacker
Chicago, Illinois 60606

Dear Ms. Mason:

Pursuant to our telephone conversation of this afternoon, I am enclosing a dozen copies of our report BPI-7292, Lake Michigan Major Industrial Polluter Inventory, which is the revised version of the inventory we submitted at the Enforcement Conference on September 19, 1972.

Because this revised report contains clarifications and later data, we would prefer that this version go into the printed transcript of the proceedings instead of the version which we gave out on September 19.

Sincerely yours,

David Dinsmore Comey

DDC:kam
Enclosures

Businessmen for the Public Interest

109 N. Dearborn St., Suite 1001, Chicago, Illinois 60602, (312) 641-5570

BPI-7292

LAKE MICHIGAN MAJOR INDUSTRIAL POLLUTER INVENTORY

Prepared for

Lake Michigan Enforcement Conference

September 21, 1972

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NEW YORK TIMES, SUNDAY, DECEMBER 19, 1971

The New York Times/Gary Settle

Alexander Polikoff, right, Chicago lawyer who serves as executive director for Businessmen for the Public Interest, going over water pollution report with David Dinsmore Comey, environmental research director for the organization, at unit's office.

Business and Public Interest

By SETH S. KING

CHICAGO — Businessmen contributing money to support a corps of reformers who are taking after some of Chicago's business and political giants?

Strange, but it's happening here in what the participants insist is an affirmation of a new social consciousness in the business community. Or at least a demonstration of what that social consciousness ought to be.

Their instrument for doing this is Businessmen for the Public Interest, a nonprofit corporation that functions through four young lawyers, three research associates, and a board of directors from among the 40 Chicago business concerns that help pay part of B.P.I.'s $250,000 annual budget.

In its literature, B.P.I. describes itself as a "combination of watchdog, research center, law firm and ombudsman." Among its chartered purposes it lists the objectives of providing relief for the poor and distressed, lessening neighborhood tensions, eliminating prejudice and discrimination, and improving the environment.

B.P.I.'s tactics have been simple: Send its lawyers into court or before regulating agencies to force compliance with the law or win new legal interpretations that will force the corporation or the government to act.

With their lances leveled at anything from Commonwealth Edison to Mayor Richard J. Daley's Chicago Housing Authority, B.P.I.'s directors say they have only one criterion to guide them on whom or what they attack: It must be an action that will have an impact on the system and lead to significant changes in it.

●

A major portion of B.P.I.'s interest has been centered on environmental improvement, particularly in protecting Lake Michigan from further pollution. But this has not diverted it from charging into such varied matters as repeal of the state's criminal abortion laws, racial discrimination in admitting students to Chicago's largest commercial high school, alleged favoritism in tax assessments on large Chicago banks, fee splitting among Chicago attorneys, or secrecy among Chicago aldermen in the ownership and financial backing of cable TV franchises.

On the pollution front, B.P.I. won its most impressive victory this spring. After gaining the right to appear as a citizens' group before an Atomic Energy Commission licensing board, B.P.I., acting with the Sierra Club, forced the Consumers Power Company of Michigan to agree to construct cooling towers at its Palisades nuclear plant that will eliminate the dumping of hot water into Lake Michigan.

The agreement will add several million dollars to the Palisades installation costs. But it broke the united resistance of other lakeside power companies against anything except direct discharges into the lake. The Northern Indiana Public Service Company has since agreed to install a cooling tower at a lakeside nuclear plant in Indiana and the Federal Environmental Protection Agency has ruled that all lakeside nuclear plants must have equivalent closed-cycle cooling systems.

The B.P.I. has already run full tilt a Mayor Daley on two matters. It has gone to court to publicize its charge that there was a blatant conflict of interest in the handling of a large urban renewal project sponsored by the Chicago Housing Authority. And it is participating in a second court suit backing its contention that the Board of Education, which owns the land on which Midway Airport is situated, is short-changing Chicago's school children by renting the airport to the City's Department of Aviation at a value rate below the fair value.

This summer B.P.I. lost the first round in a law suit to force steel power, and chemical companies to purify the industrial wastes they pump into Lake Michigan near Chicago. But it is continuing an appeal to a higher court. Meanwhile, it has a special corps of law, medical, and engineering students taking samples of Lake Michigan water and preparing evidence for B.P.I. to use in identifying major sources of pollution around this end of the lake.

Most of the supporters of Businessmen for the Public Interest are executives of smaller companies, but they represent a wide spectrum of the business community. Among them are investment brokers, small manufacturers, hotel executives, retailers and bankers.

●

When asked why they donate funds to an organization that has already embarrassed Commonwealth Edison, United States Steel, and the Cook County Assessor, among others, most say it's because they believe the business community has a civic obligation to make the system work and B.P.I. is an ideal means, for them, of fulfilling that obligation.

"It's not without some trepidation that I went in," Elliot Lehman, president of Fel-Pro Inc., an automotive supply company, said recently. "The power companies have often been our customers, and I know what the B.P.I. is trying to do in pollution control could cost them a lot of money. But if we're motivated only by fear, then we're missing what this country really stands for."

Increasingly tougher air pollution controls, supported vigorously by B.P.I., have meant that Saxon Paint Supermarts, a hardward chain, will have to scrap $100,000 worth of old incinerators and pay a rubbish collector to haul away trash.

"This is a painful move for us," said Alan Saks, president of Saxon and an enthusastic supporter of B.P.I. "But in the long run, this will benefit the whole community."

The organizing impetus for B.P.I. came two years ago from Gordon Sherman, then president of Midas-International, the muffler repair chain, who has since been pushed out of that company in a proxy battle.

●

Mr. Sherman, who had a reputation among Chicago's nervous business establishment for aggressive social consciousness, provided most of the funds in B.P.I.'s first year. The Midas-International Foundation still gives generously. Midas, and three other foundations are in for $170,000 in 1971. The remaining $80,000 comes from the businessmen-contributors.

Looking to next year, the B.P.I. directors have organized a 15-man group of businessmen to begin soliciting more operating funds.

"We aren't looking for large contributions from any of the businessmen we call on," said Alexander Polikoff, a prominent Chicago civil rights lawyer who now serves as B.P.I.'s executive director. "We'd rather have $1,000 from 200 involved businessmen than $100,000 from two of them."

Mr. Polikoff admitted that B.P.I. had not as yet sought any funds from Commonwealth Edison or United States Steel.

"But who knows," he asked, "maybe they'll decide we're a good way to demonstrate their social consciousness? It would be nice if they did."

CAVEAT LECTOR

This inventory should be approached with caution. The ZIP codes may be the only correct numbers in it. It is based on the Refuse Act Permit Program [RAPP] applications filed by the polluters with the U.S. Army Corps of Engineers during the late spring and summer of 1971. This means, first of all, that the data on which the inventory is based are more than one year old. Secondly, it is based on data submitted by the polluters themselves, not on data independently prepared from random unannounced sampling. Although the Refuse Act Permit Program application form must be signed by the company's highest official having knowledge of the contents of the discharge (very often the president), and the form clearly states that any "false, fictitious or fraudulent statement or entry" on the application will be punished by imprisonment up to 5 years and/or a fine of $10,000 (18 U.S.C. 1001), the data still may not be accurate. Many of the samples were one-time only average grab samples instead of composites that were spread over a long time period, and often non-standard methods of analysis were used.

Furthermore, the rank ordering of these companies was done in accordance with parameters that are widely used but not necessarily ones in which we have a great deal of confidence. For example, BOD$_5$ is used almost universally, but we have grave doubts as to its reliability as an indicator of pollution, especially for paper mill wastes, where a BOD$_{100}$ would be more indicative of the actual loadings. For those who wish to quarrel with the parameters that we have used in ranking these polluters, we can only say that you are free to take the data in our tables and make your own rank orderings based on whatever parameter you think is most significant.

In one sense, the size of the discharge says little about the quality of the abatement technology that the polluters may be using. A particular polluter may be achieving 90 percent removal on some parameter, but because of the total volume of his waste streams, his remaining discharge is still a large one.

All of the figures in this inventory are net loadings rather than gross. Because we found a number of situations where a polluter was situated on an already grossly polluted river, but added relatively little pollution to the river, we chose not to use the gross average discharge figures set forth in the Refuse Act Permit Program applications. Instead, we subtracted the intake water concentrations from the outfall concentrations in order to arrive at the net concentration added by the polluter. We then calculated the pounds per day loadings on this basis. In cases where a polluter added 10 milligrams per liter (mg/l) of something to a stream already containing 50 mg/l at his intake, we did not think it was fair to calculate his pounds per day loadings on the basis of the 60 mg/l figure submitted on the application; we instead used the 10 mg/l for which he was responsible.

Once the net loadings were calculated for each polluter, we screened them by means of the effluent criteria set forth on page 2 of this inventory. Those effluent criteria, which we use internally at BPI in order to evaluate discharges, plus some arbitrary cut-off points for given parameters (such as a BOD$_5$ cut-off of 100 pounds per day), gave us the basis for our list of 117 major polluters of Lake Michigan. We were surprised that out of the 578 polluters in the Lake Michigan basin who have applied for RAPP permits, so many would rank as major polluters. We were also surprised that 62 out of the 117 major polluters were not on the Status of Compliance list of the Lake Michigan Enforcement Conference. We have marked each of these 62 major polluters that are not on the list with an asterisk (*).

In order to assist citizen activists who may wish to examine the RAPP applications, we have provided the application number for each polluter. The third digit in the application number indicates whether the application is on file at the Detroit office or the Chicago office of the U.S. Army Corps of Engineers. If the third digit is a "1" (e.g. 2710456), then the application is at the Detroit office (U.S. Army Corps of Engineers, Detroit District Office, P.O. Box 1027, Detroit, MI 48231; telephone (313) 226-6813); if the third digit is a "2" (e.g. 2720104), then the application is at the Chicago office (U.S. Army Corps of Engineers, Chicago District Office, 219 S. Dearborn St., Chicago, IL 60605; telephone (312) 353-6436).

I would like to thank Hal Bohner, Paul Duvall, Ernest Dunwoody, Beryn Roberts, Cary Malkin, Jim Baxter, Paul Pritchard, Tom Kalinowski, Tahir Zia, David Brown, Bill Pentelovitch, Dennis Adamczyk, and Wallace Oliver of the BPI staff for their many weeks of labor in producing this inventory. I would also like to thank Ms. Mary Ann Smith for volunteering to help with the final calculations.

DAVID DINSMORE COMEY
Director of Environmental Research

Chicago, Illinois
21 September 1972

BPI EFFLUENT CRITERIA
(in mg/l)

Mercury	0.0005	Molybdenum	0.100
Beryllium	0.001	Sulfide	0.200
Selenium	0.002	Surfactants	0.200
Thallium	0.002	Arsenic	0.250
Cadmium	0.005	Nickel	0.250
Zinc	0.010	Antimony	0.250
Cyanide	0.010	Manganese	0.500
Titanium	0.010	Ammonia (as N)	1
Chlorinated hydrocarbons*	0.010	Total Phosphorus (as P)	1
Pesticides	0.010	Aluminum	1
Chlorine residual §	0.010	Barium	1
Phenols	0.050	Boron	1
Chromium	0.050	Iron	1
Copper	0.050	BOD_5	4
Lead	0.050	COD	10
Cobalt	0.050	TSS	20
Silver	0.050	Chloride	125
		Sulfate	500

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* Except pesticides

§ For continuous chlorination

ABBREVIATIONS

BOD_5	Five-day biochemical oxygen demand
BTU	British thermal unit
COD	Chemical oxygen demand
N	Nitrogen
P	Phosphorus
TDS	Total dissolved solids
TS	Total solids
TSS	Total suspended solids
mg/l	Milligrams per liter (equivalent to parts per million)

Industry: PETROCHEMICAL

Name of Polluter Location RAPP No.	COD	BOD_5	TS	TDS	TSS	Oil and Grease	Phenols	Chloride	Sulfate	Ammonia (as N)	Total Phosphorus (as P)	Cyanide	Zinc	Chromium	Copper	Lead
	Average Pounds Added Daily															
American Oil Co. Whiting, IN 46394 2720170	31,886	7,143			1,946	1,589	68	10,803	22,895	1,307						
Cities Service Oil Co.[1] East Chicago, IN 46312 2720668	16,907	3,272	16,907	5,999		1,031	8.2			415					125.0	38.2
Atlantic Richfield Co. East Chicago, IN 46312 2720045	4,161		27,345	26,948	396	158	2.6	11,413		357		1.98	0.48	0.24		
Mobil Oil Corp. East Chicago, IN 46312 2720106	807	272	4,462	4,454	8	2	18.4		1,358	15		0.39		6.7		
TOTALS:	53,761	10,687	48,714	37,401	2,350	2,780	97.2	22,216	24,253	2,094		2.37	0.48	6.94	125.0	38.2

Footnote: 1. Scheduled to close permanently December 31, 1972.

Industry: CHEMICAL

Name of Polluter Location RAPP No.	COD	BOD_5	TS	TDS	TSS	Oil and Grease	Phenols	Chloride	Sulfate	Ammonia (as N)	Total Phosphorus (as P)	Cyanide	Cadmium	Zinc	Copper	Arsenic
			Average Pounds Added Daily													
• Martin Marietta Chemicals Refractories Division[1] Manistee, MI 49660 2710595	23,420		1,041,700	1,041,130		43		535,220	950							
Abbott Laboratories North Chicago, IL 60064 2720236	6,003	2,401	36,685	36,018	1,334	560				414	80					52
• Dow Chemical Co. Ludington, MI 49431 2710422	5,951	101	2,901,091	2,888,873	14,253											
• Hooker Chemical Co. Montague, MI 49437 2710375	1,001	651	288,105	286,854	225			154,373	18,140							
• Chemetron Corp. Holland, MI 49423 2710099	3,527	881	11,967	11,890	76	54	1.37	5,311	2,418	44	2	0.9		0.51	1.39	
• Amway Corp. Ada, MI 49301 2710169	2,721	1,028	1,781	1,641	140	273			12	6	38					
• Ott Chemical Co. Muskegon, MI 49445 2710001	1,901	544	15,995	15,272	729			7,058	4,085	1,144	42	0.39				
• Ansul Co. Marinette, WI 54143 2720298	1,206	451	6,260	6,172	96	335	4.73	651	7,600		17		0.22	2.41		3.78
Lever Brothers Co. Hammond, IN 46320 2720546	1,203	558	215	43		120	1.33									
• Allied Chemical Corp. Industrial Chemicals Div. Chicago, IL 60633 2720589	1,165	150	9,698	9,259	438				1,261					6.8		
• E.I. DuPont de Nemours Montague, MI 49437 2710112	868	434	13,173	13,065	54			3,708	4,310					2.55		
Union Carbide Corp., Chemicals and Plastics Div. Whiting, IN 46394 2720011	573	1,691				397										

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Industry: CHEMICAL (Continued)

Name of Polluter Location RAPP No.	Average Pounds Added Daily COD	BOD_5	TS	TDS	TSS	Oil and Grease	Phenols	Chloride	Sulfate	Ammonia (as N)	Total Phosphorus (as P)	Cyanide	Cadmium	Zinc	Copper	Arsenic
* Harbison-Walker Refractories (Division of Dresser Industries, Inc.) Ludington, MI 49431 2710525	487		26,544	24,230	1,096											
* Morton Chemical (Division of Morton-Norwich Products, Inc.) Manistee, MI 49660 2710357	450		388,613	388,344	257			150,654		82			0.12	0.57		
* Parke, Davis and Co. (Subsidiary of Warner-Lambert Co.) Holland, MI 49423 2710700	337	394														
Hardy Salt Co. Manistee, MI 49660 2718356			37,784													
E.I. DuPont de Nemours Industrial Chemicals Dept. East Chicago, IN 46312 2720889	67	140	69,156	67,547	191			4,810	10,535	1,161	13			164.0		
* Medusa Portland Cement Co. Charlevoix, MI 49720 2710442			6,219	6,219	27	3.9			1,279							
TOTALS:	50,880	9,424	4,854,986	4,796,557	18,916	384	7.43	861,785	50,590	2,851	192	1.29	0.34	176.8	1.39	55.8

Footnote: 1. Formerly Standard Lime and Refractories Co.

Industry: METAL REFINING

Name of Polluter Location RAPP No.	Average Pounds Added Daily TSS	TS	TDS	Oil and Grease	Phenols	COD	BOD$_5$	Chloride	Sulfate	Ammonia (as N)	Total Phosphorus (as P)	Cyanide	Cadmium	Zinc	Chromium	Copper	Lead	Arsenic
Inland Steel Co. East Chicago, IN 46312 2720129	98,234	174,416	100,690	17,739	442	49,130	14,648	53,375	13,896	5,340		1,416		879	4		59	15.8
Youngstown Sheet and Tube Co. East Chicago, IN 46312 2720389	63,318	196,265	172,910	9,552	472	20,269	1,789		284	152		1,505		12				
U.S. Steel Corp., South Works Chicago, IL 60617 2720612	49,523	94,986	94,986	183	12.3	21,045	5,530			46								
U.S. Steel Corp. Gary Works Gary, IN 46401 2720608	41,035	591,187	613,103	10,688	162	118,387	21,823		284	339				1,476				
Bethlehem Steel Corp. Chesterton, IN 46304 2720246	10,634	90,422	75,661	1,906		8,949	1,685	28,805	2,124	212	262		17.0	12				
* Republic Steel Corp. Chicago, IL 60617 2720566	10,593	33,770	24,487	793	27.7	7,938	204					10	0.6					
* International Harvester, Wisconsin Steel Division Chicago, IL 60617 2720140	2,802	18,565	15,763			2,452				63								
U.S. Steel Corp., Waukegan Works Waukegan, IL 60085 2720611		Data not available																
* Milwaukee Solvay Coke Co.[1] Milwaukee, WI 53204 2720297	430	2,752	2,322	148		1,528				23		1						

Footnote: 1. Division of Pickands-Mather and Co.

Industry: METAL REFINING (Continued)

Name of Polluter Location RAPP No.	TSS	TS	TDS	Oil and Grease	Phenols	COD	BOD$_5$	Chloride	Sulfate	Ammonia (as N)	Total Phosphorus (as P)	Cyanide	Cadmium	Zinc	Chromium	Copper	Lead	Arsenic
	Average Pounds Added Daily																	
• Neenah Foundary Co. Neenah, WI 54956 2720427	304	629	408			685	193			5								
Anaconda American Brass Co., Kenosha Division Kenosha, WI 53140 2720054	255	3,998	3,743						936					61	26	98		
Fansteel, Inc., Fansteel Electrometals Div. North Chicago, IL 60064 2720467	174	1,378	568			789	22	139		56	7	0.1	0.1			1.6		
National Steel Corp. Midwest Steel Division Portage, IN 46368 2720355	23	57,546	53,128	38		1,473	158				2,361							
TOTALS:	277,325	1,271,914	1,157,769	41,047	1,116	232,645	46,052	82,319	16,727	6,236	2,630	2,932	17.7	2,440	30	99.6	59	15.8

Industry: METAL WORKING AND FABRICATING

	Name of Polluter Location RAPP No.	COD	BOD$_5$	TS	TDS	TSS	Oil and Grease	Phenols	Chloride	Sulfate	Ammonia (as N)	Total Phosphorus (as P)	Cadmium	Zinc	Chromium	Copper
		Average Pounds Added Daily														
	Whirlpool Corp., Plant 7 St. Joseph, MI 49085 2710436	11,543	33	1,014	459	407	117	99							7.0	
*	Whirlpool Corp., Plants 1-6 St. Joseph, MI 49085 2710562	[illegible],146	993	4,398	976	508					26				1.0	
*	Teledyne Continental Motors (Division of Teledyne Industries, Inc.) Muskegon, MI 49443 2710403	2,862	587	6,752	5,835	917	642	3						2.0		
*	Du-Wel Metal Products, Inc. Bangor, MI 49013 2710015	1,407	147	12,370	12,309	61									0.06	0.02
*	Kohler Co. Kohler, WI 53044 2720431	867	87	7,206	2,950	4,034		59		1,308				9.0	17.0	6.0
*	Tecumseh Products Co. New Holstein, WI 53061 2720041	653	104	2,616	2,560	55	104					244			35.0	
*	General Motors Corp., Diesel Equipment Division Grand Rapids, MI 49501 2710164	541	112									0.2	0.45		2.44	1.07
*	Falk Co. Milwaukee, WI 53201 2720342	212	99	1,837	2,133	344	48	0.14			329					
*	Benton Harbor Malleable Benton Harbor, MI 49022 2710812	171		777	718	188	53							14.4		
*	Home Plating Co. Sturgis, MI 49091 2710566	167	54	1,170	1,124	44										
*	Clark Equipment Buchanan, MI 49107 2710571	152	14	1,849		187	83									

Industry: METAL WORKING AND FABRICATING (Continued)

* Michigan Tube, Inc. Eau Clair, MI 49111 2710612	70		2,000	1,900	37				282	25			19	0.08	0.54
* Henco Enterprises, Inc. Niles, MI 49120 2710572		125	975	949	26							3.1	2.2	0.29	
* Gibson Products Greenville, MI 48838 2710320			9,440	14,384					6,581				122.0		
J.I. Case Co. Racine, WI 53403 2720058		356	1,444	1,999	79	73		490	76	3	204		4.0		1.0
TOTALS:	23,892	2,733	51,848	48,296	6,541	1,120	59.1	490	8,247	384	448	3.6	172.9	62.9	8.6

Industry: METAL MINING

Average Pounds Added Daily

RAPP No.	Name of Polluter	Location	TS	TDS	TSS	Oil and Grease	Zinc	Sulfate	Chromium	Copper
2720623	* Hanna Mining Co.	Iron Mountain, MI 48901	26,144	25,889	113					
2720116	* Inland Steel Co., Sherwood Mine	Iron River, MI 49935	7,168		375		11	3,848		
2720451	* Cleveland Cliffs Iron Co., Empire Mine	Ishpeming, MI 49849	5,564	5,761		128			0.09	0.06
2710108	* Inland Steel Co.	Gulliver, MI 49840	4,939	4,652						
2720449	* Cleveland Cliffs Iron Co., Republic Mine	Ishpeming, MI 49849	3,310	3,183	127	140				
		TOTAL:	47,125	39,485	615	268	11	3,848	0.09	0.06

State: MICHIGAN

Industry: PAPER[1]

RAPP No.	Name of Polluter	Location	Average Pounds Added Daily BOD$_5$	COD	TSS	Population Equivalent of BOD$_5$ Added
2710158	Packaging Corporation of America	Filer City, MI 49634	56,301	180,189	8,931	331,050
2710443	* Manistique Pulp and Paper Co.	Manistique, MI 49854	10,325	6,401	60,952	60,711
2710162	* Scott Paper Co., S.D. Warren Co. Division	Muskegon, MI 49443	6,720	57,093	9,877	39,514
2710553	* Menasha Corp., Paperboard Division	Otsego, MI 49078	5,180	53,540	3,070	30,458
2720095	* Mead Corp., Escanaba Paper Co. Division	Escanaba, MI 49829	4,112	7,590	4,854	24,179
2710104	* Hammermill Paper Co.[2]	Watervliet, MI 49098	3,471	7,180	3,560	20,409
2710433	* French Paper Co.	Niles, MI 49120	1,861	3,655	709	10,943
2710101	Mead Corp., Paperboard Products Division	Otsego, MI 49078	1,220	2,241	447	7,174
2720409	American Can Co.	Menominee, MI 49858	1,215	2,732	542	7,144
2710007	* Brown Co., Specialty Paper Division	Parchment, MI 49004	1,201	2,837	974	7,062
2710549	* Plainwell Paper Co., Inc.[3]	Plainwell, MI 49080	808	1,489	323	4,751
2710106	* Simplicity Pattern Co., Inc.	Niles, MI 49120	806	2,024	1,323	4,739
2710100	* Allied Paper, Inc.[4]	Kalamazoo, MI 49001	783	3,052	447	4,604
		TOTAL:	94,003	330,023	96,005	571,660

Footnotes:

1. Includes pulp, paper and allied products.
2. Formerly Watervliet Paper Co.
3. Division of Nicolet Paper Co.
4. Subsidiary of SCM Corp.

State. WISCONSIN

Industry: PAPER[1]

RAPP No.	Name of Polluter	Location	Average Pounds Added Daily BOD$_5$	COD	TSS	Population Equivalent of BOD$_5$ Added
2720411	American Can Co.	Green Bay, WI 54305	87,507	286,354	17,464	514,541
2720134	Scott Paper Co.	Marinette, WI 54143	55,530	156,198	12,495	326,516
2720132	Scott Paper Co.	Oconto Falls, WI 54154	50,446	196,526	8,567	296,622
2720296	Charmin Paper Products Co.[2]	Green Bay, WI 54305	48,180	91,690	11,048	283,298
2720327	Consolidated Papers, Inc.	Appleton, WI 54911	46,881	845,159	0	275,660
2720105	Fort Howard Paper Co.	Green Bay, WI 54305	46,594	78,442	34,946	273,973
2720198	* Niagara of Wisconsin Paper Corp.	Niagara, WI 54151	33,537	58,139	64,183	197,198
2720186	Kimberly-Clark Corp., Kimberly Mill	Kimberly, WI 54136	32,427	44,151	47,984	190,671
2720341	Bergstrom Paper Co.	Neenah, WI 54956	24,461	57,420	13,209	143,830
2720181	Badger Paper Mills, Inc.	Peshtigo, WI 54157	20,817	79,736	5,378	122,404
2720285	Green Bay Packaging, Inc.	Green Bay, WI 54305	19,871	21,947	1,836	116,841
2720234	Thilmany Pulp and Paper Co.[3]	Kaukana, WI 54130	19,082	28,085	15,728	112,202
2720289	Appleton Papers, Inc.[4]	Combined Locks, WI 54113	17,394	63,878	41,652	102,277
2720293	John Strange Paper Co.	Menasha, WI 54952	12,262	7,117	2,851	72,100
2720146	Riverside Paper Corp.	Appleton, WI 54911	1,660	7,457	10,571	9,761
2720189	Kimberly-Clark Corp., Neenah Paper Mill	Neenah, WI 54956	1,100	3,835	1,458	6,468
2720184	Kimberly-Clark Corp., Lakeview Division	Neenah, WI 54956	904	1,908	477	5,316
2720461	Shawano Paper Mills, Inc.	Shawano, WI 54166	435	6,300	855	2,558
2720183	Kimberly-Clark Corp., Badger-Globe Division	Neenah, WI 54956	421	0	379	2,475
2720441	George A. Whiting Paper Co.	Menasha, WI 54952	306	501	721	1,799
		TOTAL:	519,815	2,056,790	291,802	3,056,510

Footnotes:

1. Includes pulp, paper and allied products.
2. Division of Procter and Gamble Co.
3. Division of Hammermill Paper Co.
4. Division of NCR.

Industry: FOOD[1]

RAPP No.	Name of Polluter	Location	Average Pounds Added Daily BOD$_5$	COD	TS	Population Equivalent of BOD$_5$ Added
2710441	* Frigid Food Products, Inc.	Suttons Bay, MI 49682	7,201		8,191	42,342
2710091	* Eagle Ottawa Leather Co.	Grand Haven, MI 49417	4,748	22,095	27,595	27,918
2720034	American Maize-Products Co.	Hammond, IN 46326	1,634	3,689	4,854	9,608
2710190	* Heinz, USA	Holland, MI 49423	1,542		14,531	9,067
2710371	Stokely-Van Camp, Inc.	Scottsville, MI 49454	1,101	2,059	6,626	6,474
2720171	Branch Cheese Co.	Branch, WI 54203	412	1,112	2,257	2,423
2720399	Foremost Foods Co.	Appleton, WI 54911	398	489	198	2,340
2720599	Cedar Valley Cheese Factory	Belgium, WI 53004	384		616	2,258
2720061	Cold Springs Cheese Factory, Inc.	Hilbert, WI 54129	168	778	567	988
2710523	* Elberta Packing Co.	Elberta, MI 49628	152	234	263	894
2720400	Foremost Foods Co.	Adell, WI 53001	114	438	592	670
2720698	Carney Milk Products Co.	Carney, MI 49812	105	220	848	617
		TOTALS:	17,959	31,114	67,138	105,599

Footnotes: 1. Includes Leather Processing and other BOD-intensive facilities.

Industry: ELECTRIC POWER

RAPP No.	Name of Utility	Name of Facility	Location	Type	Heat Added (Billions of BTU's per hour)	Flow (Millions of gallons per day)
2720683	* Commonwealth Edison Co.	Zion Station	Zion, IL 60099	Nuclear	14.0**	2,203
2720233	* American Electric Power Corp.	Donald C. Cook Plant	Bridgman, MI 49106	Nuclear	14.0**	2,368
2720276	* Wisconsin Electric Power Co.	Point Beach Plant	Two Creeks, WI 54241	Nuclear	6.4**	1,008
2720272	Wisconsin Electric Power Co.	Oak Creek Plant	Oak Creek, WI 53154	Fossil	6.2	1,596
2720352	* Commonwealth Edison Co.	Waukegan Station	Waukegan, IL 60085	Fossil	4.1	861
2720443	Commonwealth Edison Co.	State Line Generating Station	Hammond, IN 46326	Fossil	3.5	857
2720652	* Wisconsin Public Service Corp.	Kewaunee Plant	Kewaunee, WI 54216	Nuclear	3.4**	593
2710186	* Consumers Power Co.	J. H. Campbell Plant	West Olive, MI 49460	Fossil	2.5	327
2720202	Northern Indiana Public Service Co.	Bailly Generating Station	Chesterton, IN 46304	Fossil	2.2	456
2710197	* Consumers Power Co.	B.C. Cobb Plant	Muskegon, MI 49440	Fossil	1.9	450
2720201	Northern Indiana Public Service Co.	Mitchell Generating Station	Gary, IN 46401	Fossil	1.9	413
2720659	Wisconsin Power and Light Co.	Edgewater Generating Station	Sheboygan, WI 53081	Fossil	1.7	186
2720273	Wisconsin Electric Power Co.	Port Washington Plant	Port Washington, WI 53074	Fossil	1.6	631
2720278	* Wisconsin Public Service Corp.	Pulliam Plant	Green Bay, WI 54305	Fossil	1.5	320
2720271	* Wisconsin Electric Power Co.	Lakeside Plant	Milwaukee, WI 53207	Fossil	1.2	301
2720274	* Wisconsin Electric Power Co.	Valley Plant	Milwaukee, WI 53233	Fossil	1.0	111
2710187	* Consumers Power Co.	Big Rock Point Plant	Charlevoix, MI 49720	Nuclear	0.5	73

NOTE: Consumers Power Company's Palisades Plant and Northern Indiana Public Service Company's Michigan City Plant are both constructing cooling towers. Northern Indiana Public Service Company's Bailly Generating Station Nuclear 1, if built, is also scheduled to have a cooling tower.

** Required to construct closed-cycle cooling system if March 23, 1971 recommendation of Lake Michigan Enforcement Conference is enforced.

LAKE MICHIGAN BASIN TOTALS*

Average Pounds Added Daily

BOD_5	700,673	(Population Equivalent: 4,119,957)
COD	2,779,105	
TS	6,341,725	
TDS	6,079,508	
TSS	693,554	
Chloride	966,810	
Sulfate	103,665	
Oil and Grease	45,599	
Phenols	1,280	
Cyanide	2,936	
Ammonia (as N)	11,565	
Total Phosphorus (as P)	3,270	
Cadmium	22	
Zinc	2,801	
Chromium	100	
Copper	235	
Lead	97	
Arsenic	72	

*From the 117 major polluters (estimated to represent 90 percent of total industrial loadings)

CHICAGO SUN-TIMES, Wed., Sept. 20, 1972

Businessmen say some polluters of lake ignored

By Bruce Ingersoll

Businessmen for the Public Interest Tuesday asked a conference of anti-pollution officials why some corporations in the Lake Michigan basin are treated as water polluters and others seemingly go scot-free.

The environmental group also submitted to the Lake Michigan Enforcement Conference its own inventory of industrial pollution in the lake basin.

The fourth session of the four-state conference was opened in the Sherman House with a federal report on how well industries and communities are complying with clean-up requirements.

The businessmen's group's environmental research director, David D. Comey, asked why the enforcement conference hasn't put 10 power plants and 33 industries, including what it described as many major dischargers, on a timetable for pollution abatement.

Edison plants 'overlooked'

Comey said the conferees have overbooked Commonwealth Edison's generating stations in Waukegan and Hammond as well as the Republic Steel Corp plant and International Harvester's Wisconsin Steel Works on the South Side.

The two steel mills discharge into the Calumet River, which sometimes empties into Lake Michigan.

He also pointed out that two new steel mills at the Indiana lake port of Burns Harbor — Bethlehem Steel and Midwest Steel — do not come under the purview of the conference.

Comey expressed dismay that 24 dischargers in the state of Michigan are not regarded as threats to the lake either.

In explanation, James O. McDonald, enforcement chief for the Midwest Region of the U.S. Environmental Protection Agency (EPA), said that when the conference was first convened in 1968, each state was asked to identify the industrial discharges that affect the lake. Michigan listed just five industries, compared with 38 in Wisconsin.

Only five called harmful

Ralph Purdy, executive secretary of the Michigan Water Resources Commission, contended, "Only those five discharged a waste that harms water quality so as to affect the health and welfare of citizens in other states."

The conference's original intent, he argued, was to deal with inter-state pollution, not discharges into tributaries of the lake.

EPA officials said there is a timetable for power companies to meet thermal (heat) pollution regulations, but the federal policy of closed-cycle cooling at new nuclear plants has not won the support of all four of the states bordering the lake.

The EPA reported Tuesday that 21 per cent of the 76 industries on clean-up schedules are behind schedule, and that 44 per cent of the 146 municipalities are behind in eliminating phosphorus from their sewage effluent.

Many of the industries ranked by the businessmen's group as voluminous polluters were listed by federal officials as being on schedule or in full compliance. These included the American Oil Co. plant at Whiting, rated by the group as the No. 1 polluter among the petrochemical firms, and Inland Steel at East Chicago, described as the top-ranking polluter among the metal refiners.

BPI based its inventory on data the companies supplied to EPA more than a year ago, when they applied for waste discharge permits under the Refuse Act of 1899.

Chicago today, Tuesday, September 19, 1972 ★★★

Claim plan ignores many lake polluters

BY JAMES PEARRE

Science writer

Health & Medicine

MORE THAN A THIRD of the major industrial polluters of Lake Michigan have been omitted from a federal-state plan to clean up the lake, a Chicago environmental group charged today.

Of 111 industries which discharge pollutants into Lake Michigan, only 67 are subject to clean-up requirements formulated by the four Lake Michigan states and the federal government, said David D. Comey.

Comey, environmental chairman of Businessmen for the Public Interest, listed the 43 offenders in a report to the Lake Michigan Enforcement Conference, a meeting of federal and state officials responsible for the lake pollution abatement plan.

Comey's list of firms omitted from the clean-up plan included four major area steel companies: Republic Steel Corp. and the Wisconsin Steel Division of International Harvester, both in Chicago; National Steel Corp. Midwest Steel Division and Bethlehem Steel Corp., both in Indiana.

The conference, which opened today in the Sherman House, is being attended by the top water quality officials of Illinois, Indiana, Wisconsin and Michigan, in cooperation with the federal Environmental Protection Agency. The conferees have imposed pollution clean-up schedules on 76 industrial firms since 1968.

CHICAGO
Sun-Times

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Editorial Page Thurs., April 20, 1972

Businessmen for the Public Interest

Friday the organization formed three years ago called Businessmen for the Public Interest will celebrate an anniversary luncheon at the La Salle Hotel. A third anniversary is usually no great occasion but the BPI has accomplished so much in so short a time that its luncheon rates more than passing interest.

The BPI has served as a public watchdog, research center, law firm and ombudsman. It has cut a course different from other civic watchdog organizations — it has pursued its objectives with court suits, advertising and by furnishing legal counsel and research to other like-minded organizations such as the American Civil Liberties Union.

BPI has great interest in environmental pollution but its activities range from attempting to change the archaic abortion laws to tax reform, from opposition to a lake airport to police reform.

It is willing to tackle the so-called establishment and the businessmen who support it consider themselves as honestablishment.

We have also been on the receiving end of BPI's criticism; it filed a friend-of-the-court brief in support of an appeal against the four major Chicago newspapers for refusing an advertisement considered by the papers unfair. BPI lost that case in the Supreme Court, but the incident increases rather than decreases our respect for the BPI, which in general has a viewpoint like ours.

So we salute the organization, and its two mainsprings, Alexander Polikoff and Marshall Patner, and wish it a successful fund-raising lunch and many more years of prodding the powers that be.

CHICAGO DAILY NEWS

10 ☆ Thursday, April 20, 1972

Birthday for a gadfly

Its detractors would probably call the Businessmen for the Public Interest (BPI) the noisiest organization in Chicago, and we think its leaders would accept that as a compliment.

For BPI in its short life has poked its nose boldly and usefully into most of the relevant and controversial issues of the past three years. You name it — lake pollution, housing discrimination, human rights, the Black Panther case, scandal in the assessor's office — and BPI has been in there swinging. It is a small organization working on a small ($250,000 a year) budget. Its directors are mostly small businessmen with a keen sense of civic right and wrong. Its sparkplugs are lawyers who share that sense. Its method is to add its resources and ingenuity to those of other organizations working for the same ends. Its resources include excellent legal research facilities, legal talent, and a lot of enthusiasm. It has no delusions of grandeur, unless Jack the Giant Killer can be said to have had them. It doesn't plan to grow; it just plans to keep doing what it's doing at its own pace.

We have not always agreed with the BPI position. Indeed, it regards the metropolitan press as part of the "Establishment" and went to court against the newspapers on an issue involving our right to accept or reject advertising (the courts upheld us).

But we are bound to respect a group of Chicagoans who will stand up and say, "We care enough about all these complex human problems to do something about them."

The third anniversary will be celebrated with a luncheon at the LaSalle Hotel at noon on Friday with Sen. Charles H. Percy as speaker.

We wish Executive Director Alexander Polikoff and General Counsel Marshall Patner and their colleagues a happy anniversary and a successful future. The Establishment may not be the unmitigated scoundrel they make it out to be, but it sometimes gets a mite careless in wielding its weight and can benefit from a constructive jab in the ribs.

MR. MAYO: Any questions, gentlemen?

MR. McDONALD: Mr. Comey, this list of Lake Michigan major industrial dischargers contains 111?

MR. COMEY: That is correct.

MR. McDONALD: How does this list correlate with the list of major dischargers that EPA has prepared in co-operation with the State agencies, covering the Lake Michigan Basin, for the record?

MR. COMEY: Well, we have looked at the EPA list, and have weeded out a number of facilities that are on that list, for the simple reason that they do not cover the same ballpark as the ones we have listed here.

For example, the Chicago and Northwestern Railroad has a facility at Green Bay that both the State of Wisconsin and the EPA continue to list as a bad polluter. We have looked at their Refuse Act permit application, and the only thing that we could find of significance that they are adding to Green Bay is 11 pounds of oil and grease a day. Now that is probably 11 pounds too many, but it doesn't rank with the thousands of pounds of oil and grease that come out of the facilities, so we have not listed them. That is just an example. There are many others.

MR. McDONALD: Are the criteria that you used in selecting this list contained in this booklet?

MR. COMEY: No. Actually no criteria were really necessary. When we sat down and made these calculations, between the 111 that you have here and the rest of the close to 700, there was almost a quantum gap there, and I would say that if we had a cutoff point of something like BOD from food processors, it was at 100 pounds per day, and on some of the others -- on thermal, we did not take note of anything under half a million -- or, I am sorry, 500 million B.t.u.'s per hour. But those are the only two arbitrary points that I can think of. The rest of them are far enough down below these 111 that they are essentially a different category altogether.

MR. McDONALD: Well, I can tell you that for the EPA, our Refuse Act Permit Program will review this list. The list of major dischargers that we developed in cooperation with the States was based on our best experience and best joint expertise, and if there are dischargers that ought to be included that aren't included, we will assess this list accordingly, and so notify the State agencies that are involved in this.

Mr. Manzardo, the head of our program, is here today, and will take the responsibility for doing whatever should be done on this. Because that list that we did develop in cooperation with the State agencies about a year ago — and, incidentally, the list has been revised several times since then — was done as a simple matter of priority to weed down to those more important cases out of the thousands of applications we have. So we have got to handle them and move forward. If these cases should be added to or displace some of the cases we are working on, we will look at this list accordingly.

MR. COMEY: Well, I would be very happy, in the case of some of the dischargers that are in our list that are not on yours — I would be very happy to give those to Mr. Manzardo. It is about six in number.

MR. McDONALD: Very good.

Is that what it narrows down to approximately — about a half a dozen?

MR. COMEY: That was what I counted at 3:00 o'clock this morning, but I will not guarantee —

MR. BLASER: Mr. Comey, a minor point, but I notice the captions on the pages in your major listing shift back and forth and I was wondering if it was typographical error or intentional. You notice the page that ends up with Standard Lime, you start out with COD, BOD, and so on. The next page you start out with TSS, TS, TDS, and so on, and then you put plants. Is that typo or intentional?

MR. COMEY: No, that is intentional.

For example, we rank-ordered metal mining in terms of total solids; we rank-ordered paper companies in terms of BOD; we rank-ordered oil refineries, first, in terms of oil and grease, but then because COD gave the same rank order we decided to use COD throughout.

I might add that anyone who has a favorite parameter that he thinks is more applicable than COD or BOD is welcome to rank-order the companies using the data that are set forth in our document.

MR. FRANGOS: Mr. Chairman, I am a little bit confused on lists.

Mr. McDonald, you were talking about a difference of 6? Which lists are we comparing?

MR. COMEY: No, what I am saying is that our list of 111 contains roughly a half dozen dischargers which are not on the EPA list that Mr. McDonald was talking about.

MR. FRANGOS: Which is the RAPP* list?

MR. COMEY: Which is the RAPP list -- right -- of major dischargers; not the conference list.

MR. McDONALD: If that doesn't thoroughly confuse everybody in the audience, I don't know what will.

MR. FRANGOS: Well, let me, if I might, comment, Mr. Comey. I commend you on the effort of your staff. It is indeed a public service that you have done here in making

* Refuse Act Permit Program

the kind of analyses that you have done. Certainly we don't think we are perfect in the State agency, and I think you are also aware of some of the limitations that we have in our staffing situation.

I am just curious -- would you, by any chance, be able to come up with an estimate of how many manhours it has taken you to undertake this report?

MR. COMEY: Well, I am not very good at doing figures in my head.

MR. FRANGOS: Why don't you give me something tomorrow on it? I am just trying to --

MR. COMEY: Well, I think it took approximately 20 days times 14 people times 10 hours. So that would be 140 times 20 -- that would be about 2,800 manhours.

MR. FRANGOS: I guess the point I am trying to make: whoever does this kind of investigation, it does take a lot of research; it does require time and analytical capability. And I might add that I think that we have also been impressed by the individual reports that you have been preparing. We find them most helpful in our Department.

MR. COMEY: Thank you. That is what they are designed for.

MR. MAYO: Mr. Comey, attached to your report on the "Major Industrial Polluter Inventory," you have the additional sheet which is in the form of a recommendation to the conferees for the inclusion of an additional number of dischargers in the implementation schedule for the Lake Michigan Enforcement Conference. I am interested in knowing the extent to which the list is developed on the basis of some judgment on a demonstrated impact on waters of Lake Michigan, or was it developed on some other basis?

MR. COMEY: Well, it includes those dischargers that are in the basin. I think when you examine each of these, you will find that they either go directly into the lake or go into a major tributary. And I don't think any of us know enough about the interrelationship between the tributary rivers of Lake Michigan and the ecosystem of the lake as a whole to state that a discharge well up the Grand River in Michigan is going to have a negligible or infinitesimally small effect on the biota of Lake Michigan.

I think that, as we learn more about the signs of ecology, the more we learn that a lot more things are connected than we ever thought, and consequently I refuse to make any such distinction, and I think that anyone who does make such a distinction has the burden of proof of showing that there is no such effect.

MR. PURDY: Mr. Mayo, I would like to comment on that. I think that the fine line of distinction that you proposed in your question goes somewhat beyond what you stated, and that is that, in addition to that: How does it relate to the injuries that were identified in Lake Michigan in the early conference proceedings? And that if any of these industries that are listed here in Michigan do relate to those injuries that were identified in Lake Michign as affecting the health and welfare of persons in a State other than in which the discharge occurred, I agree with Mr. Comey that they should be under the purview of this conference from the standpoint of their performance in meeting remedial deadlines.

If they do not fall within that criteria, then I do not feel that they belong under the purview of this conference from the standpoint of meeting remedial deadlines, but we have made it a policy in Michigan to present this full information to the conferees so that they know what is going on. From the standpoint of anything being discharged into a tributary as having an effect upon the Lake Michigan quality or the biota of Lake Michigan, this is true if it is a conservative substance. If it is an oxygen-consuming substance that is satisfied within the tributary, the impact is on the tributary and not Lake Michigan, and I think that is a distinction that we must recognize here.

From the standpoint of the requirements now of the industries that have filed applications in the Refuse Act program, we in Michigan are looking forward to identifying those requirements, in accordance with the recent formal agreement that we signed a week ago last Monday, in which we have established a joint procedure between the State of Michigan and Region V of EPA to review the requirements that we have set in Michigan on industrial waste discharges, see how those fit in with the requirements of the Corps permit program, if a permit could be issued, and establish those requirements under Michigan statutes. I think that the procedures that we have established will allow us to move forward rapidly in this area.

That is all.

MR. MAYO: Well, to comment on at least one aspect of your remarks, Mr. Purdy, you seem to feel that if, in fact, we do have in this list offered by BPI dischargers whose waste would, in fact, relate to water quality in Lake Michigan, at least in keeping with the issues that have been raised at other sessions of this conference --

MR. PURDY: Correct.

MR. MAYO: -- that they should be added to the implementation schedule.

MR. PURDY: No question about it.

MR. MAYO: All right. Now how do the other conferees feel about the dischargers that are identified for the other States?

If there is general agreement on that point, then perhaps what we are faced with is a matter of mechanics of examining the list of dischargers and coming to some conclusion about their relationship to conference requirements and the reasonableness of having those dischargers added to the compliance schedule.

MR. McDONALD: Recognizing at the same time, if they are not part of the conference schedule, they are covered with what probably will be identical requirements under the Refuse Act Permit Program or any program that replaces it.

I think Mr. Comey probably has some reservations about — the Refuse Act Permit Program right now is in a difficult state, and he sees the conference as the vehicle for doing what has to be done.

MR. MAYO: Rather than pursue that in any further detail at this point, I would like to suggest that between now and the executive session dealing with this portion of the agenda, there be some discussion of the mechanics that we might collectively agree upon between the conferees for reviewing this list of dischargers and where appropriate have them added to the list of the compliance schedules, and then address that point when we get into the executive session.

Is that generally agreeable?

MR. FRANGOS: I would like to ask Mr. Comey a question: What were the criteria for listing at least 3 utilities in Wisconsin? Were we talking about thermal considerations, or were we talking about other criteria included in their discharge -- solids, for example, in blowdown?

MR. COMEY: In most of these cases, it was based on the combination of chemical effluents, many of which are actually added by the facility; many of them chlorinate their condensers in order to keep algal growth down.

In some cases, you have boiler blowdown, and in some cases you have a phenomenon that I suppose is a very difficult one to deal with. And that is that sometimes a condenser will actually, in the cooling water, add COD as a result of the passage of fairly polluted water through the condenser and back out.

In other words, if you measure the intake concentration and the outfall concentration, it will show a much higher outfall concentration.

Now the reason I say that is difficult is: The State of Illinois has been penalizing city filtration plants for the backwash on their filters, and I think that the corresponding situation with the powerplant is analagous enough that some decision is going to have to be reached on this.

But, in the case of these plants, it was mainly the chemical effluents which are added, plus the additional fact that the surface water pumps and the condenser pumps tend to kill zooplankton with quite a bit of efficiency. They kill about 30 percent of the zooplankton in the condenser, and the surface water pumps do 100 percent job.

Now in the case of the Pulliam plant, I am not aware of any zooplankton there.

MR. FRANGOS: Well, okay, it was other than just the thermal question.

MR. COMEY: Yes.

MR. MAYO: Mr. Fetterolf.

MR. FETTEROLF: Mr. Comey, I am always interested in criteria, and you have some effluent criteria listed on page 2.

MR. COMEY: That is correct.

MR. FETTEROLF: These didn't have anything to do with what followed.

MR. COMEY: Only in that we did not bother to compute any parameter on the RAPP application to give the net concentration added by that plant, did not exceed the values that we have set forth in our internal outline.

MR. FETTEROLF: Well, I am just very curious about one item: berylium at 1 microgram per liter, and I wondered what use of water you were protecting with that limitation?

MR. COMEY: Berylium in water normally will never get higher than that concentration. In other words, all of the compounds of berylium will be below that. Berylium is toxic, and consequently we pegged it at that low because if berylium was showing up in the discharge then it would obviously not be in a stable compounded form and we wanted to be alerted to that.

This is not to say that a berylium discharge higher than that might not after examination show no significant damage, but we use these internal guidelines to trigger an investigation to why it is above that level.

MR. FETTEROLF: Thank you.

MR. MAYO: Any other comments, gentlemen, with respect to the remarks by Mr. Comey?

MR. McDONALD: Yes, I would like to indicate that the reports that Mr. Comey's group has prepared havebeen used by our Refuse Act Permit Program. They present an unusual ingredient for a regulatory agency, in that we have never seen anything like this before and I doubt if there is anything like this any other place in the country, according to our other regional offices. So the reports that you do present — I notice Mr. Frangos says he looks at them and he considers them in his review processes and we also consider these — are highly unusual reports and provide a completely different insight, both in narrative, and sometimes in conclusions, and sometimes in factual situations pertaining to a particular RAPP applicant.

MR. MAYO: Thank you, Mr. Comey.

MR. COMEY: Thank you. (Applause)

MR. MAYO: If Mrs. Hall can endure it for another 8 to 10 minutes, Illinois has two brief statements by people who are here to make them personally.

Mr. Blaser.

MR. BLASER: Eileen Johnston is going to hold off until tomorrow.

James D. Griffith, the Committee on Lake Michigan Pollution -- is he still here?

MR. GRIFFITH: Still here.

STATEMENT OF JAMES D. GRIFFITH,
COMMITTEE ON LAKE MICHIGAN POLLUTION,
GLENVIEW, ILLINOIS

MR. GRIFFITH: Mr. Chairman, conferees, ladies and

J. Griffith

gentlemen. Dave Comey's presentation -- like many of you, I am sure -- leaves me with a good bit of awe -- the work and the comprehensiveness.

The Committee on Lake Michigan Pollution is a not-for-profit corporation based in Wilmette, Illinois, and with membership primarily in Chicago and 15 north and northwestern suburbs. It was organized 5 years ago in response to many persons' rising alarm over the deterioration of water quality in Lake Michigan.

The first step toward your and our mutual goal of saving Lake Michigan was achieved 3 years ago when public awareness of the problem matured through intensive publicity.

The second objective, that of obtaining adequate laws, has also been largely achieved.

The attainment of the first two objectives has lulled many people into complacency presuming that the third objective, that of halting the degradation of Lake Michigan waters, will now be achieved. The persons who benefit from use of Lake Michigan and its tributaries as an open sewer, having substantially lost the informational and legislative battles, are now operating on a more insidious level. They are making their influence felt through the White House, particularly upon the U.S. Environmental Protection Agency.

It was in December of 1970 that the Nation's 1 million pleasure boats which are equipped with toilets were given an additional 5 years to come into full compliance on sewage standards. This step was described -- before it became an actuality -- by William Turney of the Michigan Water Resources Commission as "the biggest step backward that the Federal Government has ever considered taking."

In February of 1969, the Calumet Area Enforcement Conference cited U.S. Steel and Republic Steel to the Department of Interior for their flagrant noncompliance with the December 1968 deadline set some 39 months earlier. No action was taken.

More recently, our President, in what might be termed the understatement of the year, has told a group of big business leaders that the Environmental Protection Agency was not going to put them out of business.

Continuing on its course, in January of this year, the White House, through the Office of Management and Budget, succeeded in denying the Environmental Protection Agency $141 million to clean up the Great Lakes. To gloss over this denial, the EPA request for funds was suppressed.

Our committee has a basic faith in the personnel of the EPA, but believes that the under-the-table pressure on this Agency and on other Federal agencies must be stopped if the quality of water in Lake Michigan is to be improved.

We say to the White House: "Hands off!"

This conference has before it the six recommendations of the Lake Michigan Pesticides Committee. We urge their adoption and, particularly, that less toxic substances be substituted for methoxychlor in the treatment of Dutch Elm disease.

For months the States have awaited Federal research on the effect of thermal pollution. For months the Federal Government has sat on its hands. All due haste must now be used to provide the States with the tools which must be in their hands to effectively regulate thermal pollution.

In conclusion, we urge this conference to see to the rigid enforcement of strict water quality standards. We urge this conference to put the burden of compliance upon the polluter and not upon the public. (Applause)

MR. MAYO: Any comments, gentlemen?

Certainly I feel obliged, Mr. Griffith, to respond on at least three points. With respect to the industrial waste regulations that were recently adopted by EPA and published in the Federal Register, it was the announced purpose of those regulations to accomplish a no-discharge requirement.

The regulations do provide for consideration for a limited number of vessels that might be able to enjoy the longer-range use of treatment facilities in an overboard discharge if those facilities were installed either before the Coast Guard adopted their regulations or within a stated period of time afterwards.

But it is abundantly clear that the purpose of those regulations is to achieve in the long run no discharge. It is also abundantly clear in those regulations that the States in the Great Lakes Basin can, if they so desire, make application to the Administrator for the application of a no-discharge requirement for the appropriate Lake Michigan waters of those States.

Now, although the regulation is a relatively new one, to my knowledge none of the Lake Michigan States, or none of the Great Lakes States has, since the publishing of the regulations, made such an application, and I am confident that Administrator Ruckelshaus would seriously entertain such a request if it were indeed filed. But I think that as far as EPA is concerned, as far as the Federal Government is concerned, the goal is no waste discharge from vessels, and that the mechanism is available for the Lake Michigan States or the Great Lakes Basin States to initiate a process for determining whether or not total holding tank requirement is justified under the water quality standards and if it is justified, the Administrator would be obliged under the

J. Griffith

regulations to administer such requirements and amend the regulations accordingly.

So I don't think we are faced here with any demonstration on the part of the Federal Government that it is abandoning the "no discharge" concept for waste discharges as far as the Great Lakes are concerned.

To infer that this administration is in cahoots with industry, to subvert meeting established water quality standards, I think is not justified. You need only look at the list of major corporate dischargers that are the subject matter of active and I think rather aggressive enforcement actions on the part of EPA and the Department of Justice to understand that we are not turning our backs on the tough guys. In fact, the tough guys are at the top of the list, and you need only make a cursory examination of that list to understand how intense and, I think, how dedicated the effort is.

So far as the comments on the administration denying EPA the $141 million requested for the Great Lakes program, and hushing it up -- there is nothing to hush up, and I am prepared to talk very frankly about it.

A proposal was made for a Great Lakes initiative. I think a substantial amount of that information is public knowledge already. Included in there was the recommendation that approximately $100 million be made available for some initial projects to control storm and combined sewer discharges.

The response that we got to the recommendation was that this is something that is a matter of current pending legislation, and that it would be inappropriate for the administration to attempt to make available funds for storm and combined sewer activities when the authorization for doing that is not included under the present Federal legislation; and that there was pending legislation authorizing it; and that if it was authorized, the Congress would then be making funds available under the regular appropriation process.

So there has not been a denial of the recommendation to move in that direction. There was a rationale that was offered -- that I am confident was reasonable -- and that is that the issue was before the Congress, and Congress was dealing with the matter of authorization for the expenditure of Federal funds for handling storm and combined sewer problems.

I think we may be faced with part of that continuing difficulty that we experience, and that is that the public is impatient -- but no more impatient, I don't think, than we are, because we bear the responsibility for demonstrating results. And I think we are all faced with the sense of perspective that is reasonable in terms of the facts of the situation that we are faced with.

Any comments?

MR. McDONALD: I would like to make a comment from the enforcement side of this picture also. Where you say, Mr. Griffith, on the top of page 2, that: "Our committee has a basic faith in the personnel of the EPA but believes that the under-the-table pressure on this Agency and on other Federal agencies must be stopped if the quality of water in Lake Michigan is to be improved. We say to the White House: 'Hands off!'"

I know of absolutely no pressure to do less. The only pressure I get is to do more, as the chief enforcement officer here in this Region; and I hear that all of the while. My marching orders are to enforce, and to enforce to the hilt. As far as White House pressure, congressional pressure from any Washington bureaucrats are concerned, the only pressure I have had is to do more. And I think this is a common pressure that has been exerted throughout the Agency since the Environmental Protection Agency was created in December of 1970.

So I would like to clear that up in terms of Lake Michigan, that if there is a hands-off policy, it certainly has never come to my attention as Director of the Enforcement Program here in Region V.

MR. GRIFFITH: There have been other instances of this do-as-little-as-possible policy coming from the White House, such as the proposal that only $200 million be expended for funds for local sewer projects. The thing finally went through Congress for $800 million -- which was a couple of years ago.

In the boat discharge arena, of course the local governments can still have something short of the 5-year date for compliance, but the EPA and the Federal Government should be leading the way on this, and not setting the longest date for compliance possible.

A professor at Northwestern stated a year ago last summer that there were only 10, possibly 15, years left — no, he said only 10 — for Lake Michigan to survive. And by this 5-year extension, we are cutting that possibility right in half.

MR. MAYO: Are there any other comments, gentlemen?

MR. PURDY: I have a question of the Chairman.

At the time that the initial boat regulations — the proposed regulations were published in the Federal Register, Governor Millikin made his comments to the Administrator on those proposed regulations and, at the same time, he requested that all of Michigan waters be placed in the "no discharge" category.

Must the Governor now readdress a letter to the Administrator requesting this same consideration?

MR. MAYO: I think that would be appropropriate in terms of the regulations as they have been promulgated rather than as they were proposed.

MR. PURDY: I will so inform him and I am confident that he will.

MR. MILLER: I would like to say that we are in the same position, that Indiana's Governor did so indicate in commenting upon the regulations, and I will so inform the Governor when I return to Indianapolis.

MR. MAYO: Any other comments, gentlemen?

Thank you very much, Mr. Griffith.

Mr. Blaser.

MR. BLASER: The last speaker we have from Illinois is Mr. Paul Oppenheimer, Hyde Park-Kenwood Community Conference.

He will speak on the status of compliance for approximately 3 minutes.

Apparently he has left.

That completes the Illinois public members who wanted to testify this afternoon.

MR. FRANGOS: Mr. Mayo.

MR. MAYO: Mr. Frangos.

MR. FRANGOS: I have a short letter that I would like to read into the record, if I might, at this point in time.

MR. MAYO: All right.

MR. FRANGOS: This is a letter dated September 19, 1972, to Mr. Thomas Frangos.

"At the State Division Meeting of the Izaak Walton League, which met Saturday, September 17, 1972, Mr. Walter Koepke of Manitowoc asked that a plea be made to the EPA to facilitate allotment of funds for building the projected sewerage treatment facilities in Manitowoc. We urge the EPA to do all it can to help supply the funds for the above project."

Signed Miriam G. Dahl, Chairman, Clean Water Committee, Izaak Walton League of America, Wisconsin Division.

MR. MAYO: Any comments, gentlemen?

Let's take a recess until 5:15. During that period I would like to talk to the conferees about the amount of time we want to spend on the remainder of today's agenda so we can get a determination on when to lock up tonight.

(Short recess.)

MR. MAYO: Ladies and gentlemen, in the interest of time, I would like to outline how the conferees have proposed to proceed.

We will have the Phosphorus Technical Committee report introduced with about a 5-minute summary, and then we will defer questions by the conferees with respect to the Technical Committee report and move right into the statements that are desired to be made by Dr. Stoermer, by Dr. G. Fred Lee, and perhaps one or two other statements, and provide the conferees an opportunity to have whatever dialogue is appropriate with these people this evening, and then make judgment on the time, on whether or not we will try to finish up with the item 3, the phosphorus issue, this evening. If it isn't going to be practical to do that, we will recess probably sometime around 6:30, and carry that subject over until the morning, and we will propose to reopen the conference session at 9:00 o'clock tomorrow morning.

So with that as our basic arrangement for this evening, we will proceed with the introduction of the Technical Committee report.

Mr. Bryson.

MR. BRYSON: The Technical Committee report will be presented by Mr. Howard Zar, who is the Chairman of the Phosphorus Technical Committee.

STATEMENT OF HOWARD ZAR,
PHYSICAL SCIENTIST, ENFORCEMENT DIVISION,
U.S. ENVIRONMENTAL PROTECTION AGENCY,
REGION V, CHICAGO, ILLINOIS

MR. ZAR: I am Howard Zar with the Environmental Protection Agency, Region V.

I will read some portions of the report of the Phosphorus Committee.

It is requested that the entire report be placed in the conference record as if read in its entirety.

(The report referred to above follows in its entirety.)

REPORT OF
THE PHOSPHORUS TECHNICAL COMMITTEE
TO
THE LAKE MICHIGAN ENFORCEMENT CONFERENCE

AUGUST 10, 1972

INTRODUCTION

In the January, February, and March 1968 meetings of the four-state enforcement conference on pollution of Lake Michigan, testimony and discussion was presented in regard to the conditions of eutrophication in Lake Michigan and the need for control of Phosphorus discharges to the lake and its tributaries. These discussions resulted in a recommendation for Phosphorus control by the conference as reflected in the Summary of Conference (First Session) issued by the U. S. Department of the Interior on April 12, 1968.

The pertinent recommendation reads as follows:

"Waste treatment is to be provided by all municipalities to achieve at least 80% reduction of total Phosphorus and to produce an effluent that will not result in degradation of Lake Michigan's water quality. Such treatment will provide compliance with the water quality standards for Lake Michigan as approved by the Secretary of the Interior and the appropriate State water pollution control agency of Illinois, Indiana, Michigan or Wisconsin. This section is to be substantially accomplished by December 1972."

The conference discussed the matter of Phosphorus control again in the February 25, 1969 session. These discussions resulted in a modification of the 80% removal requirement. The Summary of Conference (Second Session), issued by the U.S. Department of the Interior on July 15, 1969, reads as follows:

"The conferees discussed modification of the recommendation established by the first session of the conference that waste

> *treatment be provided by all municipalities to achieve at least 80% reduction of total Phosphorus. A basin-wide approach to Phosphorus reduction was proposed, whereby the States would determine where Phosphorus removal would be required as long as an overall reduction of 80% from municipal and industrial sources is obtained within the drainage basins of the respective States. To accomplish this, the States would estimate or compute their phosphate loadings and from this develop a program for a total Phosphorus reduction of 80%. The States will report on their Phosphorus reduction programs at the conference progress meetings to be called periodically."*

The foregoing Phosphorus requirement is the one now in force, December 1972 being the date when facilities are to be on line. The status of compliance report at this conference will discuss this matter in detail.

In the most recent session of this conference, questions were raised by the conferees as to the possible need for more stringent requirements than 80% removal. These discussions lead to the establishment of this committee at the session of this conference on March 25, 1971, and the following recommendation in the Summary of Conference issued by the Administrator of EPA on May 14, 1971.

> *"A committee will be established by the Federal and State conferees to make a determination on whether the existing phosphate control program is effective or whether it will need to be revised. Should revisions be determined necessary, the committee will consider whether the existing information*

is sufficient to recommend an improved program. The recommendations of the committee will be provided to the conferees prior to the next conference session. The assembly of necessary existing data and information on State programs for phosphate control will be coordinated through the Federal Conferee prior to the establishment of the committee."

The report provided for in the foregoing summary was furnished to the States on July 14, 1971. The committee was then established and held meetings on July 28, 1971, September 2, 1971, May 23, 1972 and July 27, 1972. The members of the committee were:

Howard Zar	U.S. Environmental Protection Agency	Chairman	Beginning	May 23, 1972
Dale S. Bryson	U.S. Environmental Protection Agency	Chairman	Until	May 23, 1972
Carl T. Blomgren	Illinois Environmental Protection Agency			
Jacob D. Dumelle	Illinois Pollution Control Board			
Oral H. Hert	Indiana State Board of Health			
Francis B. Frost	Michigan Water Resources Commission			
John G. Robinson	Michigan Water Resources Commission			
Dr. John G.Konrad	Wisconsin Department of Natural Resources			

Other parties participating in these meetings included Will LaVeille, Dr. Charles Powers, William Miller, Laurence Rohter and Daniel Crevensten all of U.S. EPA, and John Carr of USBSF&W. Phillip Reed of the City of Chicago furnished data from the Chicago South Water Plant intake.

The committee viewed its role as one of determining the level of Phosphorus loading that should be strived for on the lake and whether the 80% removal requirement is sufficient. The committee evaluated numerous scientific studies, testimony before public bodies, and calculations performed by committee members and regulatory agency staff. Specific discussion in regard to the relationship between eutrophication levels and Phosphorus loadings were presented to the committee by staff of the EPA National Eutrophication Research Program in Corvallis.

BACKGROUND

A great deal of evidence has accumulated showing that the inshore water and the Southern Basin of Lake Michigan are presently exhibiting many recognizable symptoms of eutrophication. Beeton (1965, 1969) has presented historical data showing singificant increases in total dissolved solids, chloride, and sulfate. Organic nitrogen also increased while nitrate decreased. Silica, a diatom nutrient, has likewise decreased, particularly in the southern part of the lake (Powers and Ayers, 1967; Schelske and Stoermer, 1971). The decreases in inorganic nitrogen and silica appear to be linked to increased biological production. Robertson and Powers (1967) in comparative studies of the Great Lakes, showed that with respect to increasing dissolved solids content the lakes could be ranked in the order Superior, Huron, Michigan, Erie, Ontario, and that the same order of ranking held with respect to concentrations of particulate and dissolved organic matter. This suggests strongly that the increase in dissolved solids noted by Beeton is associated with increased nutrient levels and consequent increased biological production. Schelske and Callender (1970) compared rates of primary productivity in Lake Superior and Michigan, and showed the average rate in Lake Michigan to be an order of magnitude above that in Lake Superior (3.19 vs. 0.39 $mgC/m^3/hr$). Studies by Robertson and Alley (1966) and Alley and Powers (1970) have shown significantly increased benthic production and have related this to accelerated eutrophication. Stoermer and Yang (1970) have demonstrated changes in diatom flora, particularly in the near-shore waters toward forms favoring eutrophic conditions. Copeland and Ayers (1972) found high concentrations of green and blue-green algae in the southern basin which also appear to indicate a trend to eutrophic forms.

Increased biological production in a lake is usually directly related to an increase in the supply of available nutrients. Particularly, an increase in the supply of the limiting nutrient (or nutrients) is of special importance in stimulating productivity.

The evidence at hand indicates that Phosphorus is the nutrient most critical in the regulation of biological production in Lake Michigan. Recent work by Schelske and Stoermer (1971), in which Lake Michigan water was enriched with various combinations of phosphorus, nitrogen, and silica, has shown that, when sufficient silica is present, diatom growth is stimulated by addition of Phosphorus. Sufficient nitrogen is naturally present so that it generally does not become critical. Miller (1972) in a preliminary review of Algal Assay Studies done by EPA during 1971 and 1972 at the request of this committee confirms the fact that Phosphorus is limiting in the lake.

The committee evaluated open lake Phosphorus data for Lake Michigan from a wide variety of sources for the period 1962-1970. Regrettably natural variability and inherent experimental error obscure trends in concentration to such an extent that we are unable to say from direct measurement whether any change in open lake Phosphorus actually has occurred. Beeton and Edmonson (1972) confirm that "Increases in the major nutrients, nitrogen and phosphorus are not well documented. . .because of the lack of sufficient data for earlier years. . .". An exception is data obtained by the City of Chicago, Department of Water at the South Water Filtration Plant during the period 1956-1971 (see Figure I). The source of the water is primarily from an intake 2 miles off-shore and at 35 foot depth but includes some water from a shore intake, 1/3 miles off-shore and at 25 foot depth. This data clearly shows a substantial increase in Phosphorus concentration during the period.

Tributary monitoring data for Phosphorus in Lake Michigan tributaries were used to estimate the total tributary Phosphorus loading to the lake for water year 1969. The results are given in detail in TABLE I. During water year 1969, 13.2 million pounds of total Phosphorus are estimated to have entered the lake via tributaries. Water year 1969 was chosen because of good data availability. It was a year of relatively high tributary outflow and higher loading rates than are apparent for water year 1970, a year of average flow. For example, the calculated value for Michigan tributaries in 1970 water year is some 30% less than for 1969, so 10 million pounds of Phosphorus could be a more representative figure.

It is noted that monthly water samples used to make tributary loading estimates may not reflect sudden pulses of Phosphorus discharge due to heavy rains or Phosphorus entering the lake on sediment moving along the bottom. There is the possibility, therefore, that even the wet water year of 1969 may yield a significant underestimate. Considering possible sources of Phosphorus in the basin, however, the committee considers the 13.2 million figure to be within two to three million pounds of the probable maximum.

Using the common assumption of 10 mg/l influent, 3.65 lbs/P/capita/year and 120 gallons/capita/day, or actual effluent data where available, point source discharges of Phosphorus were also estimated. These are tabulated in TABLE II. A total of 3.9 million pounds of total Phosphorus are estimated to be discharged directly to the lake via point sources and a total of 9.3 million pounds via monitored tributaries.

Estimates were also made of the amounts of Phosphorus entering the lake through soil erosion using methods developed by the U.S. Soil Conservation Service and information assembled in the Great Lakes Basin Framework Study (1972). The usual assumption of one pound of Phosphorus per ton of sediment yields a loading of 2 million pounds per year of P reaching Lake Michigan (45 #/square mile). There are, of course, other non-point sources of P besides erosion. Among these are nutrient contributions from decaying leaves and crop residues, and dissolved nutrients contained in run-off water and leachate. Estimates for the total non-point source contribution run from the 25 pounds per square mile per year figure to some 160 pounds per square mile (7 million pounds per year, basin-wide). See the summary by Keup (1968).

A tabulation of the above loading information gives:

Direct Point Sources	3.9 million #/year
Indirect Point Sources	9.3 million #/year
Erosion and other non-point sources	1-7 million #/year
*Generalized Total to Lake	14-20 million #/year (17.1 for 1969 water year)

*In interpreting these values it should be noted that not all Phosphorus reaching tributaries may be reaching the lake and not all the Phosphorus reaching the lake may be useful as nutrients. The conservative assumption, used in the above tabulation and this report is that any and all Phosphorus reaching the tributaries is considered available. It should also be kept in mind that sewage treatment plant phosphorus can be 80% to perhaps 95% controllable, non-point source discharge is perhaps 50% controllable. Approximately 5% of the total Phosphorus from municipal sources (before treatment) is discharged through combined sewer overflow.

In consideration of these estimates of Phosphorus loading, the committee attempted to see whether existing literature provided a sound technical basis for determining a "safe" loading level. One possible method, used in the Canadian-United States discussions on Lakes Erie and Ontario, was developed by Vollenweider (1968) in a study of European and North American lakes. Vollenweider was able to empirically relate loading rates and ambient lake concentrations of Phosphorus to degree of eutrophication. Since Vollenweider's work is based on empirical rather than theoretical relationships, it provides a basis for comparison which is free from assumptions.

One of Vollenweider's criteria is the classification of lakes as to their trophic state on the basis of their average depth and the average phosphorus loading rate to them on a weight/unit surface area basis. Using the calculated loading rates for Lake Michigan, Vollenweider's method yields the conclusion that Lake Michigan is oligotrophic, that is, in general good health, a conclusion which is correct for the open waters of the lake, but certainly not representative of the in-shore waters. (see Figure II)

The committee agreed that the Vollenweider method might more properly represent the shore zone if a hypothetical lake having the average depth and surface area of the 10 kilometer wide coastal strip were used. A calculation done on this basis indicates eutrophic conditions at 1969 loadings in the coastal strip and mesotrophic conditions at 1910 levels. This technique may be subject to some question, however, when applied to the coastal waters of Lake Michigan.

The Vollenweider (1968) report also discusses a critical concentration of .01 dissolved Phosphorus above which nuisance bloom conditions are likely to appear. The committee reviewed Phosphorus data from a variety of sources and decided that the equivalent critical concentration in terms of total Phosphorus would be in the range of .02-.03 mg/l. The committee attempted several simple lake-wide Phosphorus concentration models in order to evaluate the .02 value but the models were not considered adequate for the purpose. The committee is aware that areas near sewage plant and tributary discharges exceed the .02 value and that Phosphorus reduction programs are in one sense aimed at reducing the size of these areas. To provide an example, data for thermal plume behavior, Asbury and Frigo (1971), were used to provide a rough estimate of the size of these zones. Considering tributary input alone, the size of the area above .02 mg/l total Phosphorus around tributary mouths is calculated to be on the order of 45 square miles for water year 1969. If one reduces the tributary input by two-thirds, the area above .02 mg/l is calculated to be only about 15 square miles, a significant reduction.

It should be pointed out that these calculated areas are rough indicators, the model being expected to underestimate Phosphorus plume sizes. 1962-1963 data from the U.S. Department of the Interior (1968) indicates that soluble Phosphorus concentrations exceeded .01 mg/l in a substantial portion of the inshore area. In Green Bay, recent data by Sager (1972) indicates the entire head of the bay as now being above the .02 total Phosphorus level. In the Southern end of Lake Michigan, data already cited from the Chicago water intake and available from the sampling programs of various regulatory agencies indicates that much of the shore zone now exceeds the .02 level.

Discussion and Conclusions

The committee in its review of information regarding the eutrophication of Lake Michigan has concluded that Phosphorus is a serious pollutant in the lake and is the major limiting nutrient as far as eutrophication is concerned. As the committee has been unable to establish any Phosphorus loading level which it can be sure is safe, it has concluded that the appropriate course to take on Lake Michigan is to reduce Phosphorus loading to the lowest practical level.

Municipal and Industrial Treatment

In consideration of the fact that a sewage treatment plant Phosphorus control program is moving forward, the most appropriate course seems to be to push the particular technology now in use in the basin to its practical limit. The committee recommends a maximum concentration limit for municipal and industrial effluents of 1.0 mg/l total P (for 24-hour composite samples). This is the same recommendation agreed to by the United States and Canada in the recent Great Lakes Agreement for Lakes Erie and Ontario. The proposed 1 mg/l limit is more restrictive than the present 80% basin-wide requirement and achieves the reduction to 1910 levels and 2/3 reduction in tributary loadings used in the foregoing calculations.

A properly designed treatment facility can normally achieve the 1 mg/l total Phosphorus effluent standard. In the case of the facility already achieving better than 80% removal, the additional costs will depend on the particulars of plant design but can mainly be attributed to higher chemical and sludge disposal costs. In general, the additional cost is expected to be small compared to the cost of Phosphorus treatment requirement by the present regulation and represents an increase of less than \$10/million gallons. (1¢/thousand gallons)

The committee's proposal for a 1 mg/l total Phosphorus effluent standard on both municipal and industrial treatment plants should be implemented to supplement the 80% basin-wide restriction adapted by the Conference in 1969 and should be effective in December 1972. It is recognized that small municipal facilities will have special difficulty with this regulation. It is therefore recommended that facilities of less than 2000-2500 PE be exempt from the requirement. Communities below 10,000 PE and without analytical equipment for total Phosphorus analysis would be permitted to apply a 1.0 mg/l dissolved inorganic P requirement (providing that suspended solids are less than 25 mg/l) until such time as the equipment is available. It is also recognized that some plants, such as Milwaukee, will be able to do better than the 1 mg/l limit. These plants should be required to operate at the lowest practicable level. All the above requirements should be applied on the basis of a 24-hour composite sample. Each plant should be required to perform Phosphorus analysis on 24-hour composite samples at least twice monthly.

Green Bay

Degraded water quality conditions in Green Bay are quite evident and deserve special comment. These conditions are due to a combination of industrial and municipal wastes along with a relatively high degree of natural productivity. The committee believes that the 1 mg/l effluent standard applied to municipalities and industries within the Green Bay drainage basin should be sufficient to decrease the rate of degradation due to these nutrient inputs. The program should be coupled with adequate municipal and industrial waste treatment and non-point source controls to promote improved water quality in Green Bay. The above recommendations apply until more is known about the cause of the taste and odor problems now associated with Green Bay, at which point additional corrective measures may be warranted.

Southern Shore

As previously noted, degraded water quality conditions also exist in the Southern end of Lake Michigan. The committee believes that the 1 mg/l effluent standard coupled with complete removal from the basin of Illinois North Shore discharges in 1974 should be sufficient to decrease the rate of degradation due to point source nutrient inputs. The success of this program depends very strongly on broad scale improvement in this area of municipal and industrial treatment including combined sewer overflow controls. In view of the proximity of the Southern shore to population centers and the high level of use for water supply and recreation, it is essential that the progress of the above programs and water quality be closely monitored in order to determine whether additional corrective measures are necessary.

Non-Point Sources

The committee considers sediment to be a serious pollutant. Millions of dollars per year are spent dredging harbors to maintain navigability. When the effects of adsorbed phosphorus and pesticides are considered, the value of reducing erosion and sedimentation becomes more apparent.

In keeping with recognized good land use and farming practices based on soil and water conservation, the committee believes that erosion should be prevented at the source. Techniques are widely known for minimizing erosion and should be implemented with greatly increased emphasis. This will require the combined efforts of a variety of component agencies of the Department of Agriculture as well as Federal, State, and County highway commissions, and by restrictions from local authorities on the activities of land developers.

Present erosion rates in the Basin are estimated at 75 to 80% of those that would exist if there were no conservation erosion control measures installed. A complete program, using conventional rotations and supporting practices would further reduce erosion rates a factor of two to three. The annual cost to install and maintain a conservation erosion control program to maintain long-time sustained productivity is nearly 10 million dollars. A massive program to cover crops would cost considerably more. The above estimates are from LaVeille (1972).

Part of the problem with the limited success of agricultural programs in the past is due to the strictly voluntary nature of the farmer's involvement in conservation practices. There is a great need to blend voluntary programs with regulatory actions. An example of this can be found in Public Law 566, "Small Watershed Protection and Flood Prevention Act of 1954" by which the Soil Conservation Service (SCS) was authorized to promote much needed upstream watershed conservation measures. Subsequent amendments have broadened the original intent of the law to the point where emphasis is on dams, drainage, and channelization rather than on upstream soil conservation practices.

Although there is a legal requirement in P.L. 566 that upland watershed conservation measures must be applied on 75% of the watershed, these only need to be planned (not installed)before the Federal funds are allocated. The Federal Government does not use leverage which is inherently present under the law to require full watershed conservation treatment on private land. Partly as a result, upland watershed soil conservation measures are usually far from complete by the time the construction has begun; there is little apparent follow-up and no monitoring system for requiring full application and continued maintenance of such measures.

It is the committee's opinion that in addition to working out agreements between Federal and State agencies, there is a need for Federal and State action to change the emphasis of programs such as P.L. 566, Soil Bank, Crop Subsidies, etc. to require compulsory implementation of conservation measures by landowners.

Combined Sewer Overflow

No specific estimate of the Phosphorus loading from Combined Sewer Overflows to the basin has been made by the committee. A rule of thumb would place Phosphorus contained in overflows at 5% of that actually reaching the sewage treatment plant. On this basis overflows would contribute about half of sewage treatment plant Phosphorus output following treatment to the 1 mg/l level. If this estimate is at all reasonable, combined sewer overflow control is extremely important to the Phosphorus issue and needs greater attention than it has received to date. The committee recommends that a combined sewer overflow program be implemented at the earliest possible date.

Research

The committee considers the immediate research needs concerning nutrients in the drainage basin to be: (1) Refine the relationship between land use and nutrient loading. (2) Document baseline levels and nutrient content with special emphasis in the South Shore and Green Bay areas. (3) Prepare a model to evaluate and predict the effect(s) of point and non-point nutrient inflow upon biomass production and nutrient distribution in Lake Michigan. (4) Continue laboratory and field bioassay studies to identify other limiting nutrients and to determine the availability of nutrients contained in tributary inflow for support of algal growth in Lake Michigan waters.

SUMMARY

In summary, the committee has concluded that:

1. The discharge of Phosphorus at present levels has an adverse effect. Loadings of Phosphorus to the lake should be decreased to the lowest level consistent with engineering feasibility and economic reasonableness.
2. A maximum concentration limit for municipal and industrial effluents of 1 mg/l total P (for 24-hour composite samples) for facilities loaded to more than 2000-2500 PE would be a technically feasible and economically reasonable requirement.
3. The control program for combined sewer overflow should be accelerated.
4. Effective soil conservation techniques should be utilized in order to reduce the amounts of Phosphorus reaching the lake from non-point sources.
5. EPA should remove barriers which impede Federal funding for projects such as those referred to in items 2,3 and 4 above.
6. Additional research into the basic relationship between nutrient inputs and eutrophication in Lake Michigan should be conducted in order to provide a basis for controls beyond those indicated above.
7. Monitoring on an increased scale should be performed for those factors which measure the trophic status of Lake Michigan.

TABLE I

TOTAL PHOSPHORUS LOADING TO LAKE MICHIGAN

Tributary Contribution

Tributary	Total Drainage Area	Average Discharge	Tributary Phosphorus Discharge To Lake
	sq. mi.	cfs	1000#/yr.
Root	196	184	191
Milwaukee	845	470	379
Sheboygan	440	232	168
Manitowoc	442	195	142
West Twin	166	85	36
East Twin	140	71	30
Kewaunee	146	80	40
Fox	6,443	6,130	2,654
Pensaukee	160	144	25
Oconto	933	825	162
Peshtigo	1,155	1,010	99
Menominee	4,150	3,427	809
Big Cedar	387	309	30
Ford	468	435	25
Escanaba	920	1,104	108
Whitefish	315	386	30
Manistique	1,450	2,327	274
Boardman	347	331	123
Pine (Charlevoix)	370	396	31
Manistee	2,010	2,418	238
Pere Marquette	772	846	166
Pentwater	172	182	21
White	480	496	48
Muskegon	2,780	2,990	529
Grand	5,534	4,431	2,180
Black (Holland)	176	133	44
Kalamazoo	2,069	2,535	648
Black (S. Haven)	83	359	84
St. Joseph	4,311	5,635	2,107
Burns Ditch	330	327	199
Ind. Harbor		2,700	850*
	38,190	41,193	12,470

Unmonitored tributary non-point source contribution is taken to be 725,000 pounds per year (100 pounds of Phosphorus per square mile).

Total contribution from tributaries is thus estimated at 13.2 million pounds

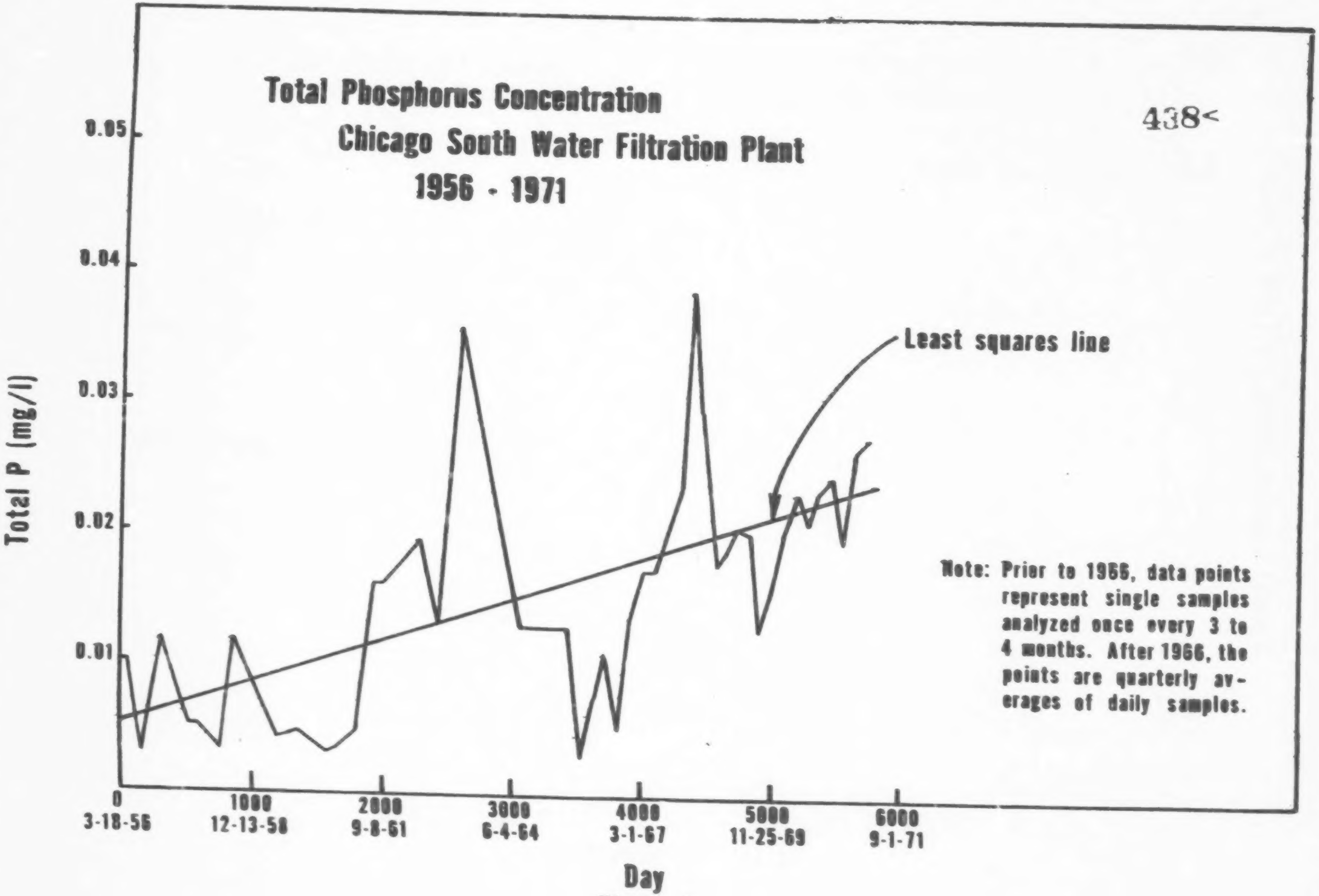
*Indiana Harbor figure may include Phosphorus originally taken from lake by industrial cooling water use.

TABLE II

TOTAL PHOSPHORUS LOAD TO LAKE MICHIGAN BASIN FROM POINT SOURCES*
(1969 Water Year)

State	Direct Point Source (10^3 lbs/year)	Via Monitored Tributaries (10^3 lbs/year)	Via Unmonitored Tributaries (10^3 lbs/year)	Total (10^3 lbs/year)
Illinois	1,032	-----	-----	1,032
Indiana	-----	1,655	62	1,717
Michigan	285	6,063	0	6,348
Wisconsin	2,545	1,600	23	4,168
Total	3,862	9,318	85	13,265

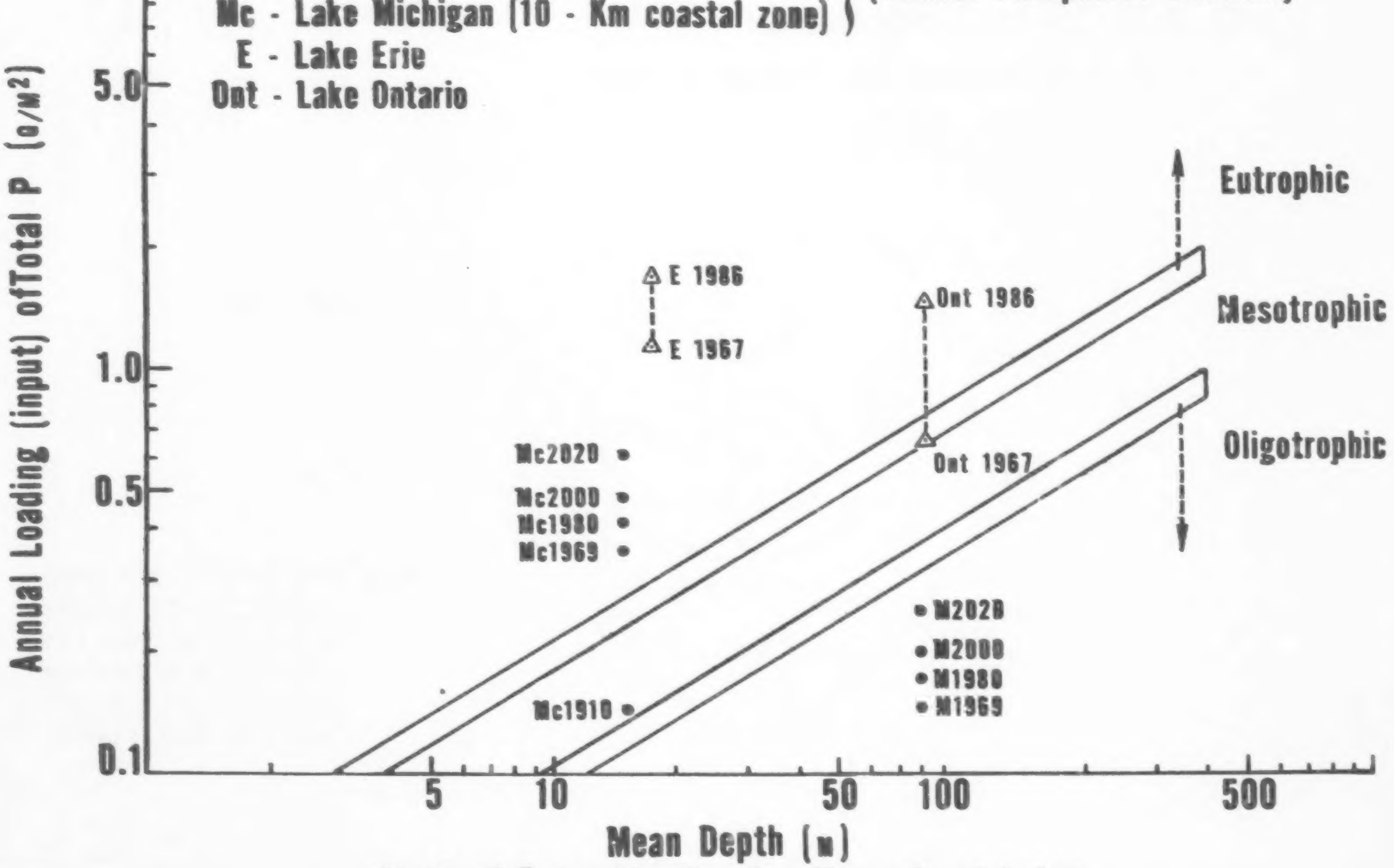
*Municipal and industrial discharges only



Total Phosphorus Concentration
Chicago South Water Filtration Plant
1956 - 1971

Note: Prior to 1966, data points represent single samples analyzed once every 3 to 4 months. After 1966, the points are quarterly averages of daily samples.

Figure I



State of Eutrophication for Three Great Lakes
(after Vollenweider)
Fig. II

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H. Zar

In the most recent session of this conference, questions were raised by the conferees as to the possible need for more stringent requirements than the present 80 percent removal requirement. These discussions led to the establishment of this committee.

The members of the committee were myself; Dale Bryson of EPA; Carl Blomgren, and Jake Dumelle of Illinois; Oral Hert of Indiana; John Robinson from Michigan; Francis Frost from Michigan; and John Konrad from Wisconsin.

The committee viewed its role as one of determining the level of phosphorus loading that should be strived for on the lake and whether the 80 percent removal requirement is sufficient. The committee evaluated numerous scientific studies, testimony before public bodies, and calculations performed by committee members and regulatory agency staff. Specific discussion in regard to the relationship between eutrophication levels and phosphorus loadings were presented to the committee by staff of the EPA National Eutrophication Research Program in Corvallis.

Now, in view of the time, I will skip the background discussion in my oral remarks.

The committee in its review of information regarding the eutrophication of Lake Michigan has concluded that phosphorus is a serious pollutant in the lake and is the

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major limiting nutrient as far as eutrophication is concerned. As the committee has been unable to establish any phosphorus loading level which it can be sure is safe, it has concluded that the appropriate course to take on Lake Michigan is to reduce phosphorus loading to the lowest practical level.

In consideration of the fact that a sewage treatment plant phosphorus control program is moving forward, the most appropriate course seems to be to push the particular technology now in use in the basin to its practical limit. The committee recommends a maximum concentration limit for municipal and industrial effluents of 1.0 mg/l total phosphorus (for 24-hour composite samples). This is the same recommendation agreed to by the United States and Canada in the recent Great Lakes Agreement for Lakes Erie and Ontario. The proposed 1 mg/l limit is more restrictive than the present 80 percent basin-wide requirement.

A properly designed treatment facility can normally achieve the 1 mg/l total phosphorus effluent standard. In the case of the facility already achieving better than 80 percent removal, the additional costs will depend on the particulars of plant design but can mainly be attributed to higher chemical and sludge disposal costs. In general, the additional cost is expected to be small

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compared to the cost of phosphorus treatment requirement by the present regulation and represents an increase of less than $10/million gallons.

The committee's proposal for a 1 mg/l total phosphorus effluent standard on both municipal and industrial treatment plants should be implemented to supplement the 80 percent basinwide restriction adopted by the conference in 1969 and should be effective in December 1972. It is recognized that small municipal facilities will have special difficulty with this regulation. It is therefore recommended that facilities of lsss than 2,000-2,500 PE be exempt from the requirement. Communities below 10,000 PE and without analytical equipment for total phosphorus analysis would be permitted to apply a 1.0 mg/l dissolved inorganic phosphorus requirement until such time as the equipment is available. It is also recognized that some plants, such as Milwaukee, will be able to do better than the 1 mg/l limit. These plants should be required to operate at the lowest practicable level. All the above requirements should be applied on the basis of a 24-hour composite sample. Each plant should be required to perform phosphorus analysis on 24-hour composite samples at least twice monthly.

With respect to Green Bay, degraded water quality conditions in Green Bay are quite evident and deserve

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special comment. These conditions are due to a combination of industrial and municipal wastes along with a relatively high degree of natural productivity. The committee believes that the 1 mg/l effluent standard applied to municipalities and industries within the Green Bay drainage basin should be sufficient to decrease the rate of degradation due to these nutrient inputs. The program should be coupled with adequate municipal and industrial waste treatment and non-point source controls to promote improved water quality in Green Bay. The above recommendations apply until more is known about the cause of the taste and odor problems now associated with Green Bay, at which point additional corrective measures may be warranted.

As noted in the body of the report, degraded water quality conditions also exist in the southern end of Lake Michigan. The committee believes that the 1 mg/l effluent standard coupled with complete removal from the basin of Illinois North Shore discharges in 1974 should be sufficient to decrease the rate of degradation due to point source nutrient inputs. The success of this program depends very strongly on broad-scale improvement in this area of municipal and industrial treatment, including combined sewer overflow controls. In view of the proximity of the southern shore to population centers and the high level of use for water supply and recreation, it is essential that the progress of the above programs and water quality be closely monitored in order to determine whether additional corrective measures are necessary.

With respect to non-point sources, the committee considers sediment to be a serious pollutant. Millions of dollars per year are spent dredging harbors to maintain navigability. When the effects of adsorbed phosphorus and pesticides are considered, the value of reducing erosion and sedimentation becomes more apparent.

In keeping with recognized good land use and farming practices based on soil and water conservation, the committee believes that erosion should be prevented at the source. Techniques are widely known for minimizing erosion and should be implemented with greatly increased emphasis. This will require the combined efforts of a variety of component agencies of the Department of Agriculture as well as Federal, State, and county highway commissions, and by restrictions from local authorities on the activities of land developers.

It is the committee's opinion that in addition to working out agreements between Federal and State agencies, there is a need for Federal and State action to change the emphasis of programs such as Public Law 566, Soil

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Bank, crop subsidies, etc., to require compulsory implementation of conservation measures by landowners.

With respect to combined sewer overflow, no specific estimate of phosphorus loading from combined sewer overflows to the basin has been made by the committee. A rule of thumb would place phosphorus contained in overflows at 5 percent of that actually reaching the sewage treatment plant. On this basis, overflows would contribute about half of sewage treatment plant phosphorus output following treatment to the 1 mg/l level. If this estimate is at all reasonable, combined sewer overflow control is extremely important to the phosphorus issue and needs greater attention than it has received to date. The committee recommends that a combined sewer overflow program be implemented at the earliest possible date.

In summary, the committee has concluded that:

1. The discharge of phosphorus to the lake should be decreased to the lowest level consistent with engineering feasibility and economic reasonableness.

2. A maximum concentration limit for municipal and industrial effluents of 1 mg/l total P (for 24-hour composite samples) for facilities loaded to more than 2,000-2,500 PE would be a technically feasible and economically reasonable requirement.

3. The control program for combined sewer overflow should be accelerated.

4. Effective soil conservation techniques should be utilized in order to reduce the amounts of phosphorus reaching the lake from non-point sources.

5. EPA should remove barriers which impede Federal funding for projects such as those referred to in items 2, 3 and 4 above.

6. Additional research into the basic relationship between nutrient inputs and eutrophication in Lake Michigan should be conducted in order to provide a basis for controls beyond those indicated above.

7. Monitoring on an increased scale should be performed for those factors which measure the trophic status of Lake Michigan.

MR. MAYO: Thank you.

Mr. Zar will be available either later this evening or tomorrow morning to respond to questions dealing with the Technical Committee report, and there are other committee members here as well who can participate in that response.

In order to move on with presentations by those private parties who have some substantive comments on the phosphorus issue, we would like to start with the comments by Dr. E. F. Stoermer of the Great Lakes Research Division,

E. F. Stoermer
University of Michigan.

Dr. Stoermer.

STATEMENT OF DR. E. F. STOERMER,
GREAT LAKES RESEARCH DIVISION,
UNIVERSITY OF MICHIGAN,
ANN ARBOR, MICHIGAN

DR. STOERMER: Thank you, Mr. Chairman. I will try to be as brief as possible.

MR. MAYO: Would you speak directly into the microphone, Dr. Stoermer? There may be some difficulty hearing in the back of the room.

DR. STOERMER: Can you pick me up now? Can you hear that in the back of the room?

... Cries of "No." ...

DR. STOERMER: Let me hold the mike. Is that better?

... Cries of "Yes." ...

DR. STOERMER: Okay. Thank you.

I have been asked by numerous parties to present some of the information we have on the Southern Basin of Lake Michigan over the past couple of years.

Recognizing the fact that very many factors impinge on this ecosystem, certainly, beyond any question, one of the most important of these is phosphorus. If we may go to the first slide, please, may we turn off the lights?

I regret to say that I don't have a prepared statement; however, we will try to operate under the assumption that a few pictures are worth a few thousand words.

In order to present --

MR. MAYO: Excuse me, Dr. Stoermer.

Will copies of these slides be available for introduction into the record?

DR. STOERMER: This particular part of this statement is public record now. Some of the material I will show later on is only now in preliminary form and it has not been published.

We would probably make this available if we can find funds.

MR. MAYO: You can make it available if what?

DR. STOERMER: If we can find funds to do it.

MR. MAYO: As far as reproduction is concerned?

DR. STOERMER: Right.

MR. MAYO: We will help you take care of that.

DR. STOERMER: Okay.

In order to place this in perspective, this is data from 10 years ago, 1962, at four stations off Chicago which I will locate for you with a little more precision later.

... Slide No. 1 ...

The thing I want to point out here: These letters refer to some of the major dominant groups of algae found in Lake Michigan. "D" refers to diatoms and "B" refers to blue-green algae. We will be talking about this a little bit later. This is a picture we got in 1962; all stations, all depths, dominance of diatoms, and a relatively low abundance of blue-green algae.

May we go on to the next one, please?

... Slide No. 2 ...

And this is just the same sort of data from later on in the fall.

May I have the next one, please?

... Slide No. 3 ...

Subsequent to the time this data was developed, Charlie Powers and John Ayers inspected some of the available records from municipal intakes around the southern basin of the lake. Particularly at Chicago, there is a fairly interesting trend in the diminution of silica. If this trend line is extended, this goes to zero sometime in the 1970's. This is obvious nonsense because a large portion of the silica is below the thermocline and not accessible to algal growth, if this is productivity-related as we believe it is. So obviously this would level at some time.

The real question is: Since the dominant group that was present in 1962, and as far as we know has always been present, has an absolute requirement for silica, and since none of the other groups do, there would be a major changeover in the algal flora of Lake Michigan.

... Slide No. 4 ...

In another project approximately the same time, we assessed the species composition of diatoms around Lake Michigan. One of the things we found out is a number of the species which had been introduced into the lower Great Lakes — particularly Lake Erie and Lake Ontario — have, within the past 30 years, been introduced into Lake Michigan. At the present time their distribution is largely restricted to nearshore areas, particularly those in the vicinity of polluted harbors.

If you can read the figures, you can see that some of these started as early as 1938, and more recent arrivals have come around 1964. Probably the end member of this sequence, as far as Lake Erie is concerned, arrived sometime around 1967. So we are quite interested in this particular phenomenon.

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... Slide No. 5 ...

Pursuing the silica question, a group of us at Michigan -- particularly Dr. Claire Schelske and myself -- performed a number of experiments in the lake using large enclosures. Plotted here on the log scale is abundance of algal cells, following various treatments as given: control; treatment with silica; treatment with nitrogen and phosphorus; and treatment with nitrogen, phosphorus and silica.

As you can see, nitrogen and phosphorus produced a fairly small effect without the addition of silica.

The conclusion from this briefly stated --

... Slide No. 6 ...

-- is that phosphorus is the controlling element so far as productivity is concerned in Lake Michigan, and that an abundance of phosphorus can cause silica depletion to the point that it is limiting to the growth of the traditionally dominant element of the flora diatoms.

This shows that by addition of enough phosphorus we can drive silica to the levels in the lake water at that time to about one-tenth of a part per million, which is apparently limiting to the growth of diatoms.

... Slide No. 7 ...

But this is a plot of data from 1971. We set out a series of stations -- 41 -- in the southern basin on Lake

Michigan, and these are arranged in geometric progression of distances from shore on three lines: one from just south of South Haven, Michigan to Waukegan, Illinois; one from just slightly south of Benton Harbor to the vicinity of Montrose Harbor; and one from the vicinity of Burns Ditch up in the axis of the lake. We are particularly interested in the nearshore phenomenon and for this reason we intensified this study nearshore.

The parameters plotted in this particular presentation are chlorophyll in the surface layers, which is an estimate of gross algal standing crop, and the concentration of silica in the water. This is in early April 1971. You can see that by far the highest standing crop is in the nearshore areas, particularly in the southeastern quadrant, and in the area where there is high productivity, silica is definitely depleted.

... Slide No. 8 ...

In May this trend continues. Bloom phenomena moves up the lake. The silica begins to be knocked down substantially, particularly on the Michigan shore.

I don't know how clear the absolute concentration is on this but you can see indicated 15 mg. of chlorophyll per cubic meter and 2 ppm of silica.

... Slide No. 9 ...

June, the initiation of stratification — you can see by this time that the silica levels are reduced in the southern part of the lake, particularly in the nearshore waters. However, at this time, the chlorophyll concentrations, indicating the algal standing crop, are also substantially reduced.

... Slide No. 10 ...

The same trend, with the exception of certain of the nearshore stations, which are subject to shore loads, particularly in the area of Benton Harbor and the area of Waukegan, standing crops remain relatively low. There is a continuing diminution of silica.

... Slide No. 11 ...

In August, with the exception of one questionable station on the right — this is probably due to an upwelling — you can see by late August that the silica levels are driven down to the order of less than 0.2 ppm and standing crop chlorophylls remain quite low.

... Slide No. 12 ...

Into September, there is some slight increase in standing crop; silica level was again quite low except in the waters immediately adjacent to shore where shoreline input or probably, to a certain extent, direct dissolution of silica from the sandy shores continuesto replenish the supply.

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... Slide No. 13 ...

Early October, the beginning of the downward mixing of the thermocline, you can see it further increased the standing crop, and the beginning of some recovery in the silica levels again particularly in the area near shore.

... Slide No. 14 ...

And the same trend continues into late October.

... Slide No. 15 ...

The interesting part of this to us is the following: This is the same type of data shown in a slightly different way. The parameters plotted here are cell counts of phytoplankton algae, and the red line is the percentage of those counts which are blue-green algae.

So early in the spring again we have high levels of standing crop and essentially no blue-green algae.

... Slide No. 16 ...

One of the things we are investigating is the distribution and the occurrence of these particular diatom species that have been introduced to the lake. This is Stephanodiscus tenuis, one of the species which has become dominant in Lake Ontario and Lake Erie. You notice that it accounts for practically 50 percent of the total population of the area of Benton Harbor. Out into the lake it is not abundant enough to be easily picked up in our population

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estimates.

... Slide No. 17 ...

Okay. On into May, again, high standing crops in the nearshore waters, with this exception of the southeastern quadrant where we had the high standing crops in April and, again, practically no blue-greens.

... Slide No. 18 ...

Into June, standing crops tend to level off. I will point out that particular point at Burns Harbor. At this time, the plume out of Burns Ditch intersected our station, and at this particular station we have got a standing crop of something in the order of 30,000 cells /ml, which is, as you know, about the highest reported for Lake Michigan to this time.

With the initiation of stratification and, plausibly, the cutoff of supply of silica from the bottom waters, it is at this stage that we first begin to pick up some blue-green algae.

You will notice that these do not occur primarily at the stations along the beaches, as you might expect, but at stations that are removed some 2 to 4 miles from shore.

... Slide No. 19 ...

Into July, standing crops are significantly reduced. Blue-green algae begin to be a factor, with the populations as high as in the order of 10 percent of the total; again, most abundant at stations 2 to 4 miles from shore.

... Slide No. 20 ...

By August of 1971, the blue-green algae have become quite abundant in the surface waters over the majority of the lake. Again, you will note that the stations closest to shore, where the silica supplies are plausibly the highest, and, indeed, demonstrably the highest, have the lowest concentrations of blue-greens.

... Slide No. 21 ...

This trend continues on into September; beginning in the extreme southern stations, a slight increase in standing crop, and the continued dominance of blue-green algae at surface stations now up to the order of 80 percent of the total population.

... Slide No. 22 ...

Unlike smaller lakes that have less thermal inertia, these blue-green algal populations in Lake Michigan hang on well into the fall. You can see that the standing crop — with the downward mixing of thermocline and resupply of nutrients to the epilimnion — levels increase, but at this time the blue-green algae still remain abundant and are dominant in the southern basin of Lake Michigan.

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... Slide No. 23 ...

And this situation maintains itself until the end of our sampling period for this particular year.

With our operation, we were limited to reaching the really critical circulation period due to the fact we can't operate our ships for those purposes on the open waters of the lake during the winter-time.

... Slide No. 24 ...

In summary, then, this is data on silica plotted versus temperature and depth for late August 1971, and this shows almost classical textbook type depletion curves for silica in the upper lake waters of Lake Michigan at this time.

This leads to a rather unique situation in our experience with lakes.

These five bottles are five 1-minute surface plankton net tows.

Station 201 is in approximately 3 meters of water — on that top line of stations we call it South Haven-Waukegan — and then a quarter mile off, a half mile off, and 2 miles.

So in terms of water quality, as a layman on the beach sees it, we are now getting apparently better water quality near shore due to the fact that the inshore waters remain highest in diatoms. We are getting better apparent water quality in terms of turbidity and algal growths on the waters immediately adjacent to shore than we are in the waters 2 to 4 miles offshore.

That concludes my remarks. We have more data that could be shown on the absolute levels of total phosphorus, but these are the main points I wish to bring out.

Thank you.

MR. MAYO: Are there any comments from the conferees? None on Dr. Stoermer's presentation?

MR. FETTEROLF: Gene, in the pie diagrams that you showed us originally from 1962, you had approximately 90 to 95 percent diatoms in your algal flora.

DR. STOERMER: That is correct.

MR. FETTEROLF: Now, you did not show us comparable slides from the 1972 information, but if you had — and I believe your initial ones were on cell counts —

DR. STOERMER: That is correct.

MR. FETTEROLF: — the 1962 slides were on cell counts — well, if we had cell counts in 1972, what percent would we have blue-greens, in comparable time periods to the initial slides?

DR. STOERMER: Okay. That data, Carlos, is from

1971.

MR. FETTEROLF: Okay.

DR. STOERMER: They are both on cell counts. They were comparable for August and September -- well, let's say September -- okay? -- for the stations we investigated in September of 1962 -- the numbers would range between 3 percent blue-green algae and approximately 20 percent blue-green algae. For 1972, they would range between approximately 20 percent blue-green algae and approximately 80 percent blue-green algae.

Now, at this point, I should stipulate something about blue-green algae -- the word "blue-green" algae seems to throw people into fits. I would say the majority of the species that we find in southern Lake Michigan, at the present time, are not those which are generally associated with obnoxious blooms. This is not true at all stations.

We have plotted a fairly broad parameter: total blue-green algae. There are several species involved. On a number of the stations we find only those forms of blue-greens which are generally associated with the waters of fairly high quality. We have at several stations found the dominance of Anabaena flos aquae, which is a bloom form, where we have also found a dominance of Anacystis cyanae -- or whatever you want to call it -- which also forms an obnoxious bloom.

We have not as yet noticed in the waters of Lake Michigan offshore the other species which is often present in problem blue-green blooms. This is Aphanizomenon flos aquae. We have not found it in the offshore waters but it is abundant in Muskegon Lake and Lake Macatawa, and areas like this.

MR. FETTEROLF: Would your data be more graphic if you presented it on a biomass comparison rather than cell count, considering the diminutive size -- the generally smaller size of the diatoms compared to the blue-green cells?

DR. STOERMER: Well, Carlos, as you are very well aware, the comparison between diatoms and blue-green algae is very much worse than a comparison between apples and oranges. We can do arithmetic on cell volumes on this. I am not too certain how productive this will be. We will eventually do it.

I would say, in general, that most of the species we are dealing with here in the blue-greens are quite small, so that calculating this on a cell volume basis would probably tend to decrease the percentage somewhat. I would say we have not done this, but we will eventually.

MR. FETTEROLF: I was wondering if your data could be even more impressive to conferees if it was done the other way. But the cell count, you feel, is definitive enough.

DR. STOERMER: My impression, at the present time, is this would probably tend to decrease the apparent abundance of blue-greens in some respect.

However, again, it is apparent from these data that during the summertime, the central part of Lake Michigan now, the diatoms are probably not growing, probably not dividing. The ones that are picking up are the ones that are just maintaining their existence.

It has been shown quite conclusively, in laboratory experiments, that by limiting the silica available, the cells are prevented from dividing. They will, however, live for a considerable period of time. They will remain viable for periods of at least 90 days without division. Apparently, in our estimation, this is what has happened. We don't have any direct evidence of this, however.

MR. FETTEROLF: Would you care to make a prediction of what possible interferences with beneficial uses of Lake Michigan might take place if this trend was allowed to continue?

DR. STOERMER: Well, there are several "ifs" in that question.

If silica remains depleted and if they keep adding phosphorus to the lake, you will eventually arrive at a situation, of course, where we would have obnoxious blooms. Apparently the condition is such now that they would grow quite nicely. The lacking ingredient apparently is simply enough nutrients to maintain very high populations.

MR. BRYSON: May I go beyond that and ask you a couple of other questions?

On your one chart, you projected the silica could possibly be depleted by 1976, and you did throw in the caveat that that might not occur.

Can I extrapolate from that comment that phosphorus control program: a) needs to be expanded; b) needs to be accelerated, and then c), d), e), and f) as you would care to add past that?

DR. STOERMER: I am afraid there has been a slight misunderstanding. You must remember that these earlier data from Chicago are a yearly average. The location of their intakes are both variable with time and, of course, over a yearly average when you mix the water, you bring it up to a certain level. So this extrapolation is in no way precise. It says it might happen. What our data says now, in matter of fact, it has happened. It happened sometime between 1962 and 1971. It has happened.

MR. BRYSON: Elaborate on that. I am not too sure I follow you. Are you saying they were past a certain point --

DR. STOERMER: Yes.

MR. BRYSON: -- is it irreversible, in your opinion? Don't leave me hanging there.

DR. STOERMER: Let's say it is a major geochemical boundary that has been passed.

With all of these things, in a complex ecosystem such as Lake Michigan, you can probably go back -- particularly in this case -- I would say you can go back, so far as concentrations of silica are concerned. It may take quite awhile.

However, when you cross these boundaries, you also perturb the rest of the biota. There are obviously -- all of the evolution that has gone on in Lake Michigan has been toward organisms at higher trophic levels which consume diatoms. Now, all of a sudden there aren't many diatoms left. Now what the total effects of this will be in the future, we are in no position to really say.

Obviously, if you could shut off, say, all of the phosphorus -- absolutely all of the phosphorus -- just seal off the lake with no more phosphorus, it would recover with no productivity and you would stabilize at something around a part per million -- plus or minus two -- something like this -- with no productivity in the surface water.

You see from these diagrams, there is still a lot of silica in the bottom waters; there is just uptake in the surface waters which aren't mixed and where the plants can grow.

MR. MAYO: Dr. Stoermer, the conferees are wrestling with the question of whether or not the levels of phosphorus control that have been earlier adopted by the conference need to be significantly revised and made more restrictive.

The Technical Committee has reached a conclusion that 1 ppm - 1 mg/l -- of total phosphorus in the effluents of the waste treatment plants is a technically practical and economically practical limit to impose in an effort to obtain further constraints on the introduction of phospohrus into Lake Michigan.

Now, do you have any opinion as to how sufficient that limitation might be for the purpose of preventing further degradation of Lake Michigan as a consequence of phosphorus being available as a nutrient?

DR. STOERMER: I will take your term "opinion" advisedly.

I have real reservations as to whether -- in the present state of the art -- the question you have asked could be computed with any great degree of accuracy.

My opinion is that you will be hard put to find sufficient mechanisms to reduce phosphorus to acceptable levels.

I think this is another one of these questions that is going to have to probably be answered: the best available technology would probably not be too good.

MR. MAYO: In your work, have you reached any conclusions as to what might be an acceptable level of introduction of phosphorus into Lake Michigan, say in terms of tons per year?

DR. STOERMER: No.

MR. MAYO: Do you think there is sufficient data presently available that might make for a determination or a good estimate of that figure?

DR. STOERMER: No.

MR. BRYSON: Well, elaborate, rather than just "No." You mean because you can't calculate it, or because we are past that point; it doesn't make any difference? We will get as much as we can out now?

DR. STOERMER: My "No" was to the ability to calculate it.

So far as I know, we have no very precise estimates of atmospheric inputs -- and I was reminded of this --

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since orbiting over O'Hare Field over an hour and a half this morning.

If you take this from a logical standpoint -- in many cases of this type we have to start with the first principles -- obviously the present inputs to Lake Michigan are much greater than they were when Lake Michigan was at its maximum desirable quality. We can cut back towards that original condition to a sizable extent.

It is almost inconceivable that we could ever get back to the inputs to Lake Michigan of the 1830's and the 1840's when we had water that you could drink just like this (indicating).

We would be able to drive it back a certain distance. How far we will be able to drive it back? I don't think it is in my power to really project this at this time. We don't have good estimates of the residence time of these nonconservative substances in large lakes such as Lake Michigan.

Part of the basin, we know, is depositional; part of the basin is erosional. There is obviously a certain input from nutrients from the original parent material. This is generally not a problem at all in small lakes. When you get into these larger lakes, like the Great Lakes, many of these numbers are just not available.

MR. MAYO: If the conference were to result in an actual control level -- 1 mg/1 -- on the dischargers for municipal and industrial wastes -- phosphorus content of that concentration -- say by the end of 1973, do you think the conferees need to be concerned at that point about there being a sufficient phosphorus load to constitute a dire hazard that something dramatic is going to happen in Lake Michigan in the way of algal growth in the next 5 or 10 years?

DR. STOERMER: Well, this depends largely on your conception of "dramatic."

Thirty thousand cells per milliliter is pretty dramatic. An increase of -- well, you have also long-term records from Chicago in terms of standing crop. This to me is a very dramatic increase.

The problem we deal with or we face is the lack of long-term systematic records from offshore stations.

The first pollution conference in 1872 generated a few of these. Every one since has generated a few more. But we don't have really a good idea of what goes on in the lake more than a mile offshore.

Now, it is perfectly conceivable -- and this has been brought up time and time again today -- that 1971 was just a bad year. We know 1967 was a bad year. Conceivably we may get a different result this summer. We are out there, and we will find out. How many years we will be able to carry this beyond this year, we don't know at the present time.

So I put down the caveat that any 1-year's data, no matter how many points are involved, in a large complex system like Lake Michigan, should be treated with due respect. The Chicago record has quite obviously never been constant. In fact there were changes as great as a factor of 2 between successive years without any really apparently definable cause. Obviously there is a cause of some type that is not contained in the record.

MR. McDONALD: Dr. Stoermer, what is your control plan for the lake?

DR. STOERMER: What is my control plan for the lake?

MR. McDONALD: Yes, sir.

DR. STOERMER: That is not my game.

MR. McDONALD: Well, that is the game we are in here, and I think that the testimony you have given is highly interesting testimony. But I think as we try to come to grips with what the control program ought to be here, anything you could do by way of saying these recommendations that have been made are either good, bad, or indifferent, or how they ought to be changed, will be a major contribution to any decision to be made here. If you can do that, I think you ought to do it, if you have given any thought to this at all.

DR. STOERMER: Well, I suffer in this context from not being an expert in engineering feasibility and things of that type.

I would find it almost inconceivable that you could go too far with the limitation of phosphorus. In terms of gross biomass, this is beyond, in my estimation, any reasonable doubt, a controlling factor, in terms of the numbers of gross biomass of algae there.

However, there are a number of things that can be also disturbing. You always say two things when you are worried about algae. You worry how many, and you worry what kind. And so far as the evidence from Lake Michigan suggests that "how many" is very, very largely controlled and almost entirely controlled by phosphorus. The "what kind" is quite a different question, and a question that has received relatively little research interest in the United States. There is some in Europe.

It appears, in my estimation, that the question of "what kind," particularly things like Cladophora and these diatom species that we were looking at, you read over and over and over and over in the literature that these particular species take a hold in the areas that are contaminated with total dissolved solids, particularly chlorides.

We know that sometime between 1896 and 1965 that the original algal flora that grew around the lake, on the rocks on the shore of Lake Michigan, largely disappeared. We know that many of the ultra-oligotrophic diatom species which once were in Lake Michigan and still occur in Lake Superior, for instance -- all of these species have a very, very low tolerance to chloride.

It has also been shown that blue-greens -- particularly in the bloom-forming varieties -- have an apparent requirement for sodium, and I think we, in general in the past, have tended to concentrate perhaps -- I won't say too much -- but too exclusively on the nutrient elements, and have let some of these conservative element problems get out of hand.

If you look at the trends in any of these conservative elements, Lake Michigan presents, from the biologist's standpoint, a really frightening picture.

You can see what goes on in these systems, such as Lake Erie and Lake Ontario, where apparently their essential ecosystems are running substantially out of control, where virtually none of the original biomass, in terms of species, exist. It has been almost entirely replaced by things which were not previously there -- at least were not previously there in any abundance.

MR. McDONALD: Let me ask you another question. In terms of the dire consequences that you predict for the lake — and if I understand you correctly, this control program that has been proposed is not tight enough, since you want maximum possible -- what would you see Lake Michigan undergoing in terms of water use, say, by the year 2000 in terms of interferences in water supply, swimming, aquatic life, types of fish, general esthetics of the lake? In other words, translating this into actual lake impairment for the many uses it has, if the type of program that you think ought to be adopted -- this maximum control program -- is not adoptable?

DR. STOERMER: As I say, that is an extremely difficult question to project on this sort of a quantitative basis.

MR. McDONALD: Well, I think this is really what we are trying to come to grips with here.

DR. STOERMER: By the year 2000? My projection would be that you would have a lake largely dominated by green and blue-green algae. We would probably arrive at a situation similar to that that exists in a few lakes in the world -- temperate lakes -- where you have a dominance of greens and blue-greens year-round. You would have undoubtedly a certain decrease in transparency. You would have at least localized and perhaps generalized occurrences over areas of at least several kilometers -- square kilometers of extent -- of blue-greens of the type which form gas vacuoles and float on the surface and are picked up by onshore winds which bring them onshore and cause problems.

Whether Lake Michigan would be unacceptable? Probably not. This has been the history from the year 1. Each generation has learned to accept what the last generation left them. We have now reached the point where this acceptance -- passive acceptance -- which we have not even thought of as acceptance -- is beginning to break down. I am not a sociologist; I am not a psychologist; and I can't predict what this means in terms of the public political process.

MR. FETTEROLF: Gene, now that you have painted that dire picture, let's talk about the possibilities of some other mechanism to maintain the existing flora of Lake Michigan.

Now, I am far from an algae expert, but I have read that for years the English reservoirs, which are used for water supplies, are dosed with silica to promote diatom growth and hold down the blue-green algae growth.

You stated there is plenty of silica in Lake

Michigan, but during -- now, I am interpreting -- but during the summer, when the blue-greens get to jump and deplete the silica so that the diatoms can't use them, the silica which remains in the thermocline and the hypolimnion is not available. But you did say there was plenty of silica --

DR. STOERMER: Yes.

MR. FETTEROLF: -- but it is unavailable.

Is there a possibility of bringing the silica up to the hypolimnion into the epilimnion and making it available to the diatoms? Is there really some possibility of some artificial loading of Lake Michigan with silica? And what are the silica sources besides shore erosion and river inflow?

DR. STOERMER: There is undoubtedly some -- with the present pH and temperature conditions, there is undoubtedly a certain input directly from dissolution of the sand on the bottom and onshore. We have no measurements of this.

The possibilities of artificial circulation or adding silica -- some of my colleagues have made some calculations on these things and they turn out just to be ridiculously expensive.

MR. FETTEROLF: As expensive as phosphorus removal? That is pretty ridiculously expensive.

DR. STOERMER: Probably to replace the silica would be at least an order of magnitude greater. This would be my off-the-cuff estimate. It would be terrifically expensive.

The other problem about this, Carlos, is in doing this you really haven't solved your problem because you can talk to a filtration plant operator sometime about a really good stinky diatom bloom, and he would rather have blue-green algae, and I am sure there are people in the room who would verify this as far as filtration plants. They would rather have blue-greens, I'd say, in most instances.

MR. MAYO: Dr. Stoermer, if I were to try to sum up your commentary, it would be that you see urgent concern for the issue of phosphorus availability as a nutrient in Lake Michigan; that it is incumbent upon the conferees to develop a control program that maximizes the reduction of phosphorus inputs, whether it is from wastewater treatment plants, industrial sources, or ultimately from land runoff; and that there also be a deliberate and very serious effort on the part of the conferees to support sufficient research in the nutrient-algal relationships in Lake Michigan to better understand what we might be able to effect in the way of control mechanisms and what we may be able to project in the way of Lake Michigan water quality. Is that pretty reasonable?

DR. STOERMER: That is, I am certain, a fair summary.

MR. BRYSON: Mr. Mayo, there are a couple of additional questions that I think need asking.

We have, on my immediate left, Dr. Charles Powers, from EPA's National Eutrophication Research Program at Corvallis. I think he may be able to give some additional questions to clarify the matter.

DR. POWERS: Thank you, Mr. Bryson.

I would like to point out that Gene Stoermer is my old-time friend and colleague, and I am not here to give him a hard time, but I would like a little clarification, Gene, since I do work for EPA.

And one of them — to go back — you mentioned the summer of 1971. You pointed out that in the summer, starting in July and carrying over into October, the percentage of blue-green algae was much higher than you had ever seen before. And I believe it got to be better than 50 percent, is that correct?

DR. STOERMER: In some cases better than 80 percent.

DR. POWERS: Okay. But I wondered, with respect to total biomass of the plankton, in terms of milligrams dry weight probably, rather than in terms of cell counts —

I wondered whether there was a difference between 1971 and previous years. That is to say, did we get an increase in standing crop of algae along with the different species that occurred?

DR. STOERMER: Well, I can give you a real killer answer on this, if I wanted to. Our highest population in 1962 was on the order of 2,400 cells/ml directly off Chicago. Our highest cells/ml in 1971 were 30,000. However I won't give you that answer because obviously, you know that the stations are not completely comparable, and the 1971 figure is an unusual occurrence.

DR. POWERS: Could you give me something a little more representative than that?

DR. STOERMER: Okay. A general average for April, around the lake, at the stations close to shore, was on the order of 8,000/ml in 1971.

DR. POWERS: Are we talking about diatoms and blue-green algae?

DR. STOERMER: We are talking about primarily diatoms. In 1962, it was on the order of 2,500 or 2,800 — something like that.

DR. POWERS: So you measured in terms of cell count and you don't have any weight.

DR. STOERMER: Well, we have chlorophyll

determination.

DR. POWERS, Of course, we wouldn't have weights back in 1962, only cell counts, oxygen, and pH, as I remember it. I said "we" because I was Gene's colleague at that time. We were sort of conversing back and forth here on this.

Okay. At any rate, as far as you are concerned, then, there was an increase in biomass from 1962 to 1971.

DR. STOERMER: Yes.

DR. POWERS: The whole summer?

DR. STOERMER: The most impressive increase -- and, again, I will say, these are 2 years taken without the history in between -- but the most impressive thing to me was the substantial increase in October.

Remember, in 1962, on these slides we showed, on the stations offshore there was practically none -- you know, 100 or 200 cells/ml on offshore stations.

Now, in 1971, our values were considerably higher in October.

DR. POWERS: Okay.

DR. STOERMER: Mostly blue-greens in this case.

DR. POWERS: Okay, now, you probably attribute this, then, to the nutrient enrichment in the lake during that period of time. I think you mentioned a while ago that increased phosphorus would result in increased biomass. I believe you said something like that, at any rate.

The point that I really want to get at here, Gene, is: Are you saying -- you also said that silica in 1971 was very low -- so is your point, then, that if we had a sufficient enrichment of the lake, possibly by phosphorus or whatever, to build the algal biomass up to a point where the diatoms, which were the original native population, had utilized the silica, there would still be enough phosphorus to continue to support the growth of algae. However, since silica had limited the growth of diatoms, the algal growth would then be expressed as blue-greens.

Is this your point? You didn't really say this, but I felt that this is what you meant to say.

DR. STOERMER: This is the most plausible assumption.

DR. POWERS: Okay. So the blue-greens really appeared, then, because of lack of silica?

Okay, then, to go tc another thing, or rather to continue this a little bit: I also understand, from what you have said, then, that we have built up the phosphorus concentration in the lake to where silica has become limiting. This means that our total standing crop of algae has also increased, and you implied to me that this phosphorus is in the lake and is going to stay there, and that our proposed phosphorus control program will not bring down these levels again, because the phosphorus should behave in a conservative manner and the phosphorus content of the waters, having gotten high, will remain high. And will you tell me whether this is what you meant?

DR. STOERMER: I don't think you ever heard me say that phosphorus behaves in a conservative manner.

DR. POWERS: No, you didn't, but you gave the implication. You said that total phosphorus was high, and that no better phosphorus control would bring it back down again. And this is the point I really want to argue with you about, I think.

DR. STOERMER: No, I don't think you heard me say that really.

DR. POWERS: This is the way it came across, and this is the main reason I wanted to come up here and talk to you because I thought we had a point here that was pretty important and that we had better make sure it was clarified.

DR. STOERMER: Yes, the behavior of the phosphorus is, in fact, a good question. How conservatively will it behave? We know in small lakes — stratified lakes without a lot of thermal inertia, that phosphorus goes fairly rapidly to the sediments particularly when it is overabundant.

How it will behave in the offshore low productivity waters of Lake Michigan? I remember very well sitting in the lab one day and arguing with you about what the currents were on the bottom of Lake Michigan and the particle size which could be moved by currents of this velocity, and we found out that there was current of sufficient velocity to move sand in the bottom of Lake Michigan, assuming that the data is correct.

So how rapidly and how, with variable sedimentation rates, the mean circulation velocity is comparable to smaller lakes, just how much or how rapid this flux of sediment is going to be is a very real question and one I don't think has been answered.

We know that during certain periods of the year, with isolated measurements, you can show a period of rapid flux, even on sandy bottoms. We also know that it moves with circulation, and what the mean residence time of an individual molecule out there in that lake is, I wouldn't care to conjecture right now. I seriously doubt whether anyone, without more extensive and precise data than is available now, can calculate it with any acceptable degree of precision.

For this reason, I would say the conservative approach is probably the right approach.

DR. POWERS: Our experience from other lakes just doesn't bear this out. Lake Washington is a classic example, where the phosphorus level was quite high and nutrient control was initiated. They stopped putting phosphorus in and phosphorus levels came down, and Lake Washington is large -- although not as large as Lake Michigan.

The other thing is where people -- well, for instance, Megard's work in Lake Minnetonka, which is a shallow lake, to be sure, and they are not comparable -- but we have found that the residence time of phosphorus in the lake is generally much shorter than the hydraulic residence time. Once again, phosphorus does not behave in a conservative manner. The point I am trying to make here is that probably when one decreases phosphorus loadings, the phosphorus concentration in that lake water is going to go down.

Now, in Lake Michigan, the evidence is that phosphorus is the limiting nutrient. In the open lake waters, the average concentration seems to be somewhere around 0.007 mg/l -- that is the number I have seen -- certainly it is not more than 0.01 mg/l. Nitrogen concentrations are much greater than this, and there seems to be no question that phosphorus is the primary limiting nutrient.

If it is limiting, this would mean that if we can decrease the amount of phosphorus in the lake water, we will decrease the amount of algal production in the water as long as phosphorus remains limiting. Since phosphorus tends to disappear from the water of a lake because of biological uptake and sedimentation, we would say that the amount of phosphorus in the lake water would decrease as loading is decreased.

DR. STOERMER: Obviously if you cut down the incoming flux, it is a good thing to do; there is no doubt about it. The real question is: We have been living for 100 years now with an always upward-increasing trend. Almost by accident, you know, we have gone past a point now which proves that it is possible to very drastically alter the system.

How many lakes do you find around the world where you find levels of silica in surface waters on the order of a tenth of a part per million, two-tenths of a part per million?

So we have shoved this system a heck of a long ways -- really a long ways -- to the point where it is a rarity on the face of the earth.

Now, again, undoubtedly we can begin to recover. Now, again, I lack the engineering expertise to really project how rapidly we are going to recover with phosphorus removal at whatever rate; and I seriously question that anybody else can really make a better than first order calculation. There are just too many pieces of the puzzle that are assumed — you know, things that are directly and rather easily measurable. You know, the state of the art now, we have to make an assumption, and granted some of these assumptions can be off a factor of 2, factor of 3, factor of 10 sometimes.

MR. FETTEROLF: Dr. Stoermer, you, in your discussion, flagged chlorides as a substance which accompanied development of blue-green algal growths.

These conferees have a chloride control program under way. But wouldn't you say that in the literature, when chlorides are flagged as something which accompanies development of blue-green algal growths, that total dissolved solids is equally important?

DR. STOERMER: Probably so. I speak to this, you know, from an algalogist bias. The European authors, in particular, construct occurrence schemes for the various algal groups -- you know, so-called halobian system, primarily on chlorides. Now, undoubtedly other things are important, and this is an area that has really received almost ridiculously little research yet.

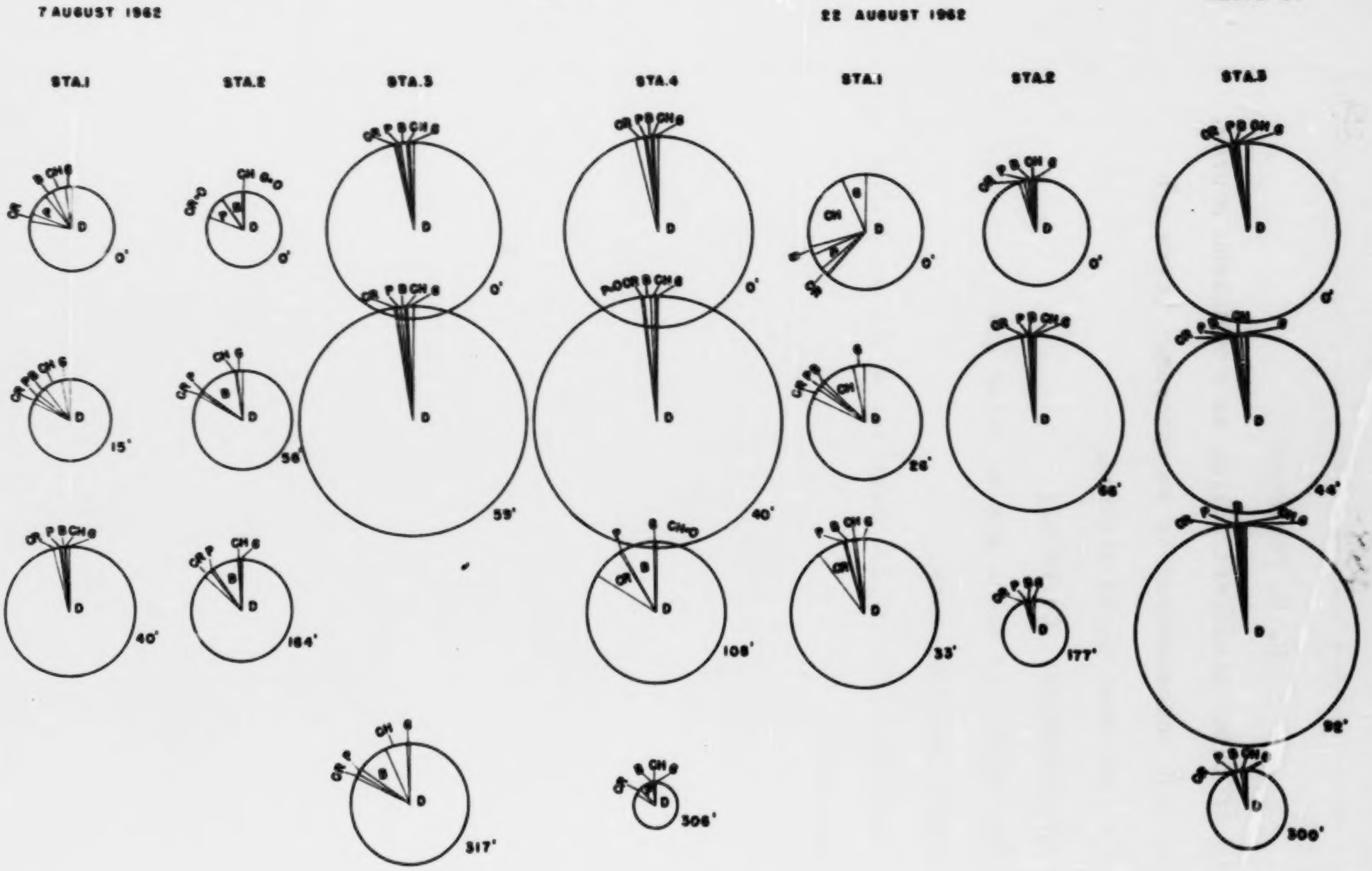
MR. FETTEROLF: Well, my point in bringing this up was so that the conferees' attention was not diverted from the concept of total dissolved solids as a nutrient source, and so they just concentrated on phosphorus. There are other things that must be considered.

DR. STOERMER: Certainly.

MR. MAYO: If there are no other questions, Dr. Stoermer, thank you very much.

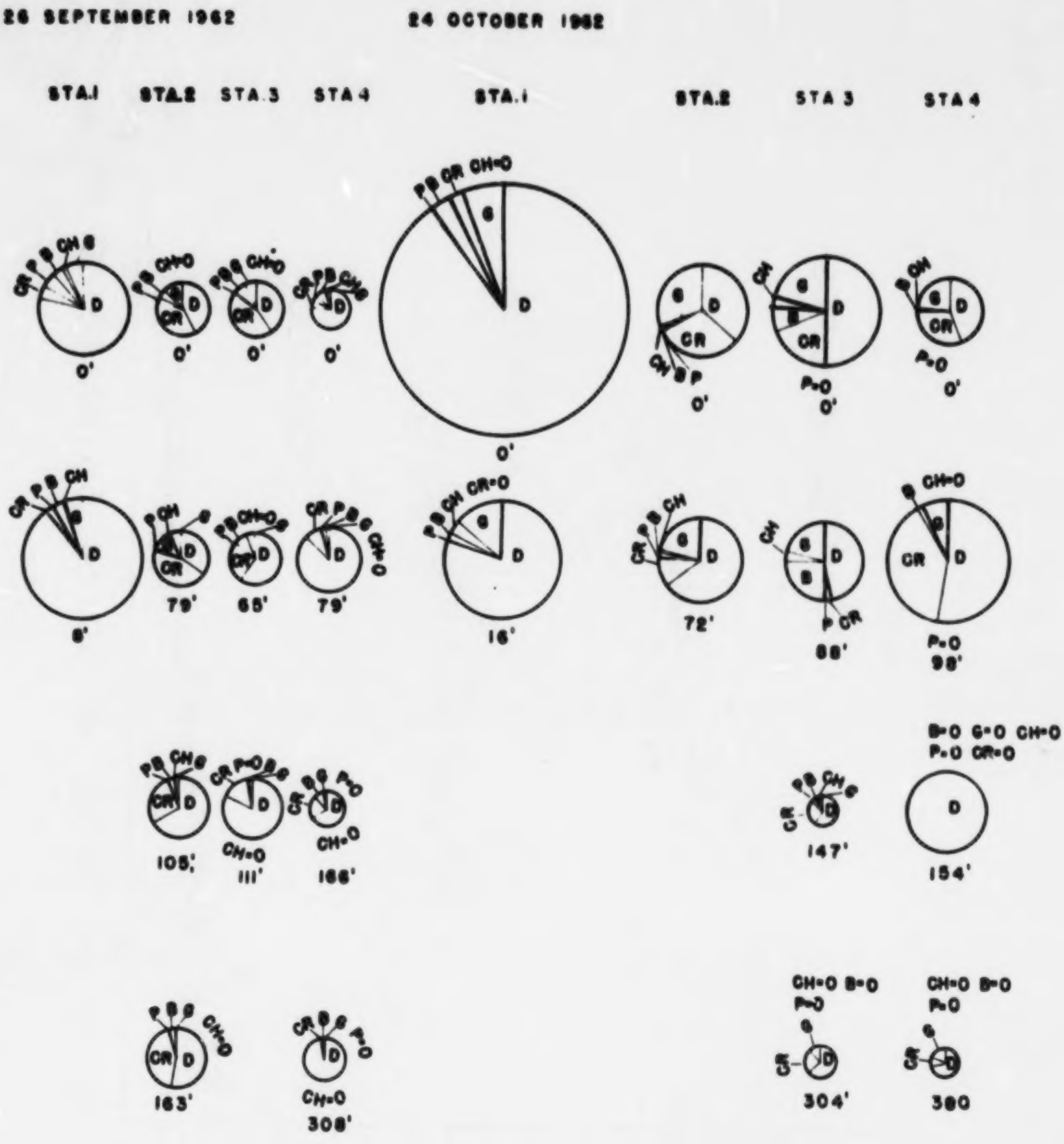
(Reproductions of Dr. Stoermer's slides follow in their entirety.)

SLIDE #1



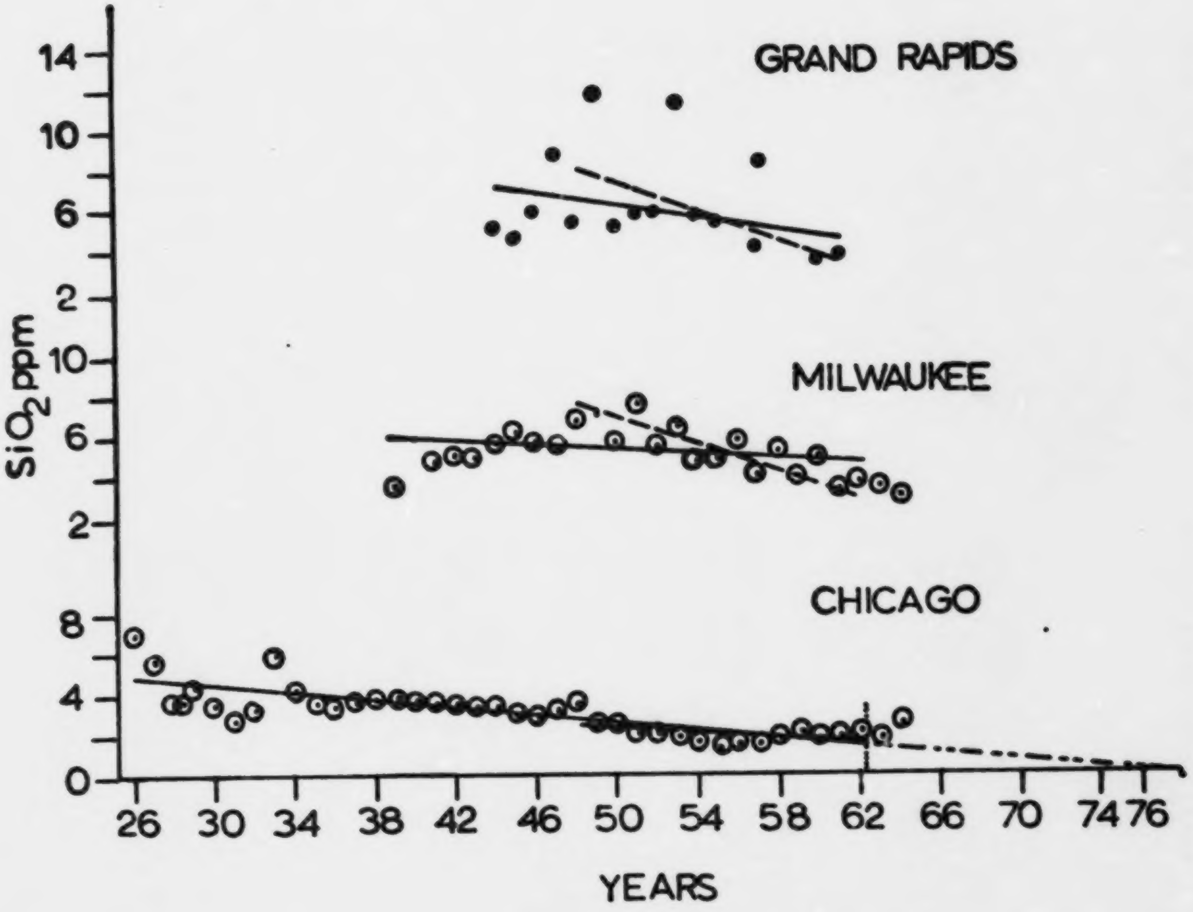
Slide 1. Vertical distribution and gross composition of total phytoplankton populations at stations 1, 2, 3, and 4 on 7 August 1962 and stations 1, 2, and 3 on 22 August 1962. Area of circles is proportional to total cell counts at depths sampled. Area of segments is proportional to contribution of major algal divisions. D - Bacillariophyta; G - Chlorophyta; CH - Chrysophyta; B - Cyanophyto; P - Pyrrophyta; CR - Euglenophyta, Cryptophyceae and unidentified flagellates. Number at lower right of circles gives depth from surface in feet.

SLIDE #2



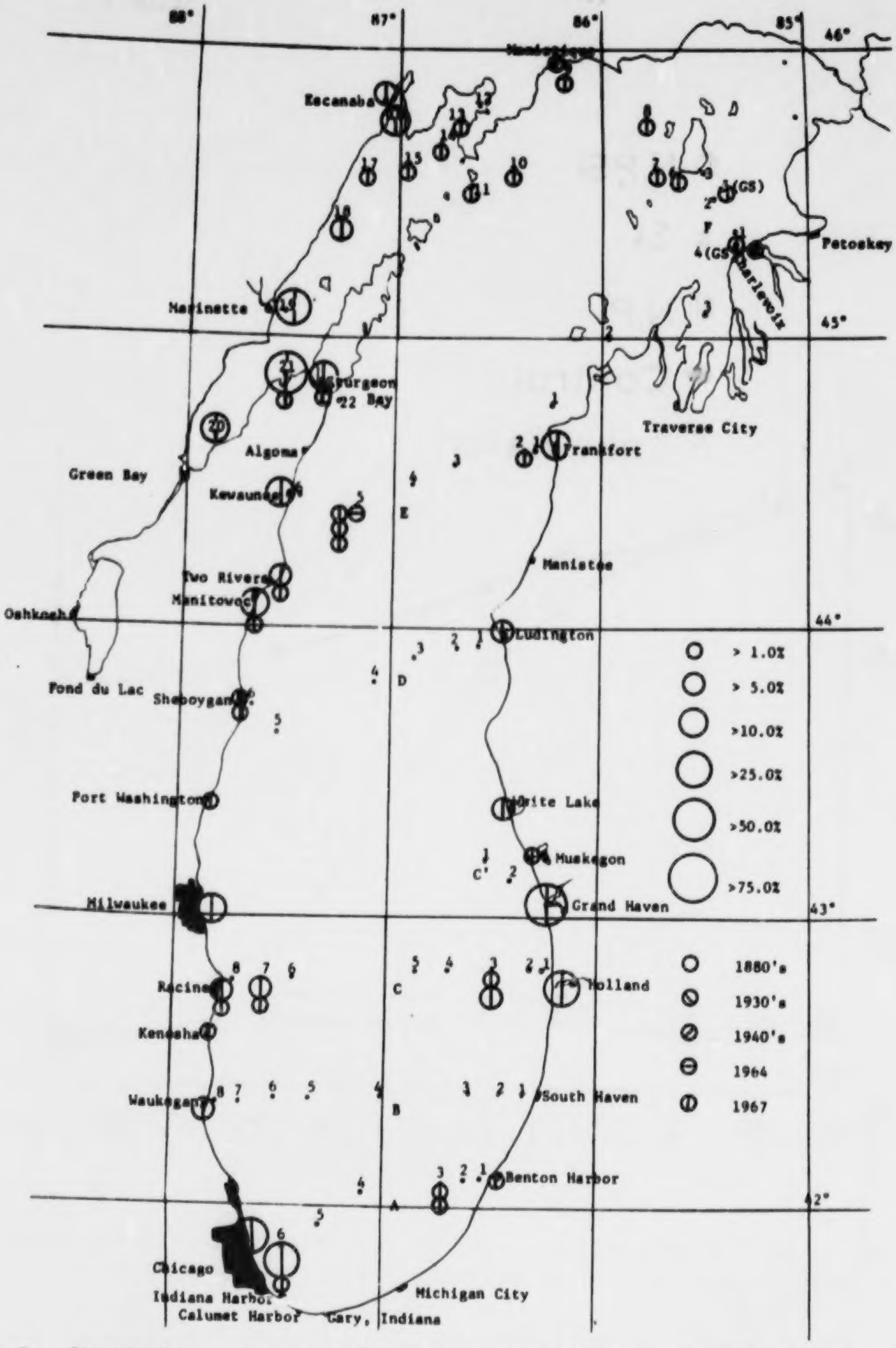
Slide 2. Vertical distribution and gross composition of total phytoplankton populations at stations 1, 2, 3, and 4 on 26 September 1962 and 24 October 1962. Labeling as in Slide 1.

SLIDE #3



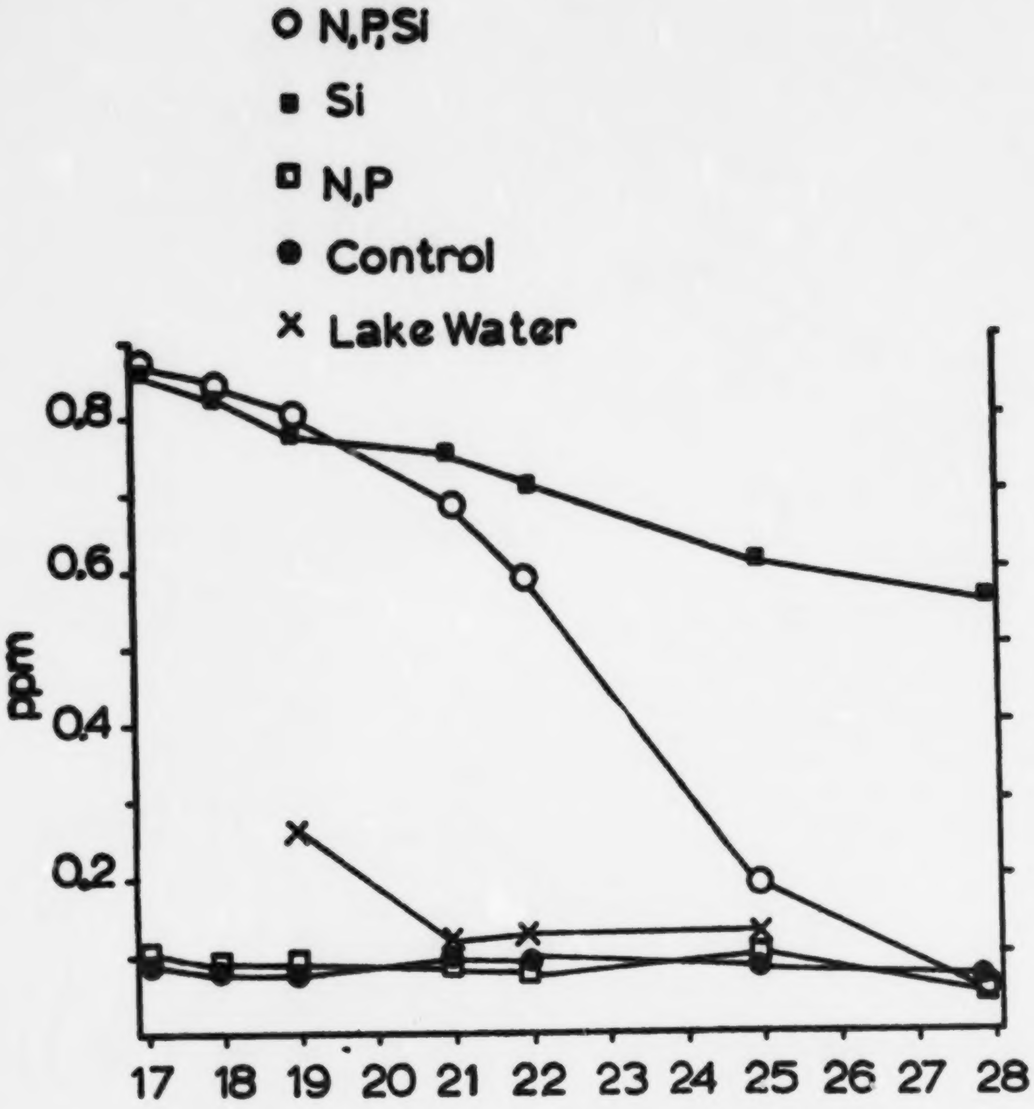
Slide 3. Concentrations of SiO_2 (ppm) in water samples collected at municipal water intakes, Chicago (from Powers and Ayers 1967).

SLIDE #4


88°
87°
86°
85°
46°
45°
44°
43°
42°
Manistique
Escanaba
Marinette
Sturgeon Bay
Algoma
Green Bay
Kewaunee
Two Rivers
Manitowoc
Oshkosh
Fond du Lac
Sheboygan
Port Washington
Milwaukee
Racine
Kenosha
Waukegan
Chicago
Indiana Harbor
Calumet Harbor
Gary, Indiana
Michigan City
Benton Harbor
South Haven
Holland
Grand Haven
Muskegon
White Lake
Ludington
Manistee
Frankfort
Traverse City
Charlevoix
Petoskey
A
B
C
C'
D
E
F
1(GS)
4(GS)
> 1.0%
> 5.0%
>10.0%
>25.0%
>50.0%
>75.0%
1880's
1930's
1940's
1964
1967

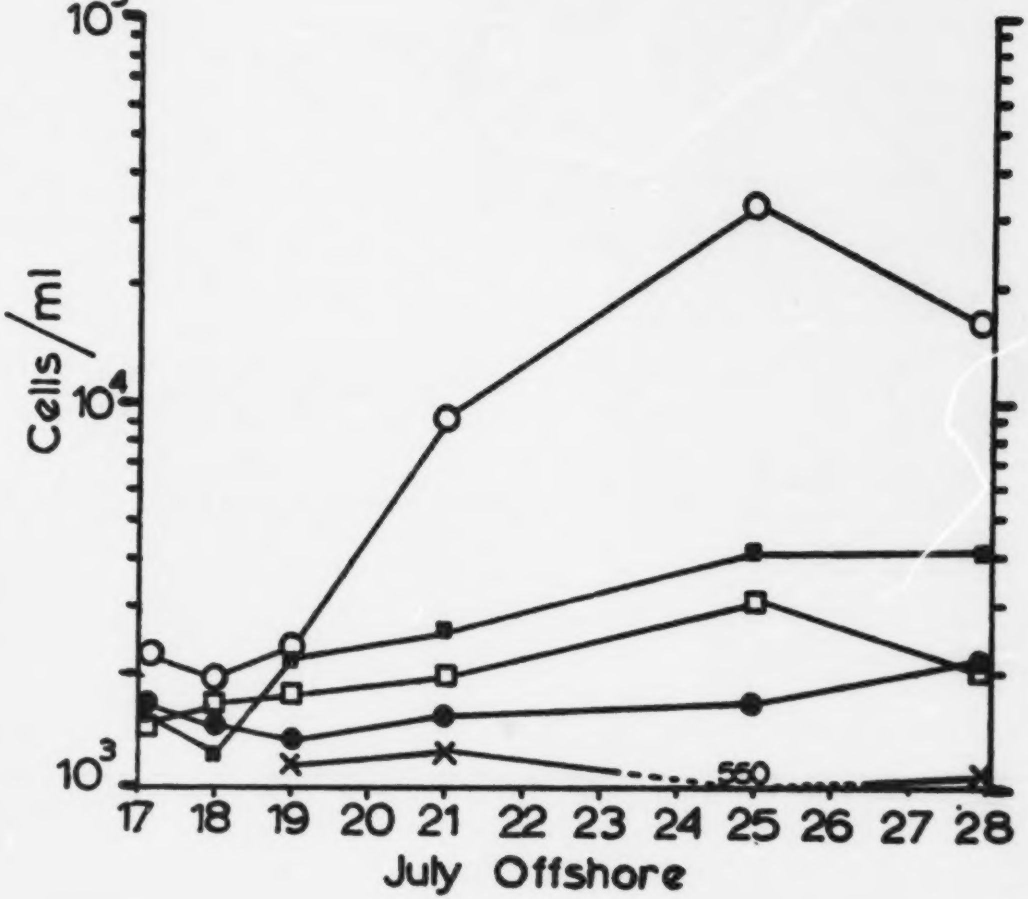
Slide 4. Abundant occurrences of Melosira granulata in plankton samples from Lake Michigan.

SLIDE # 5

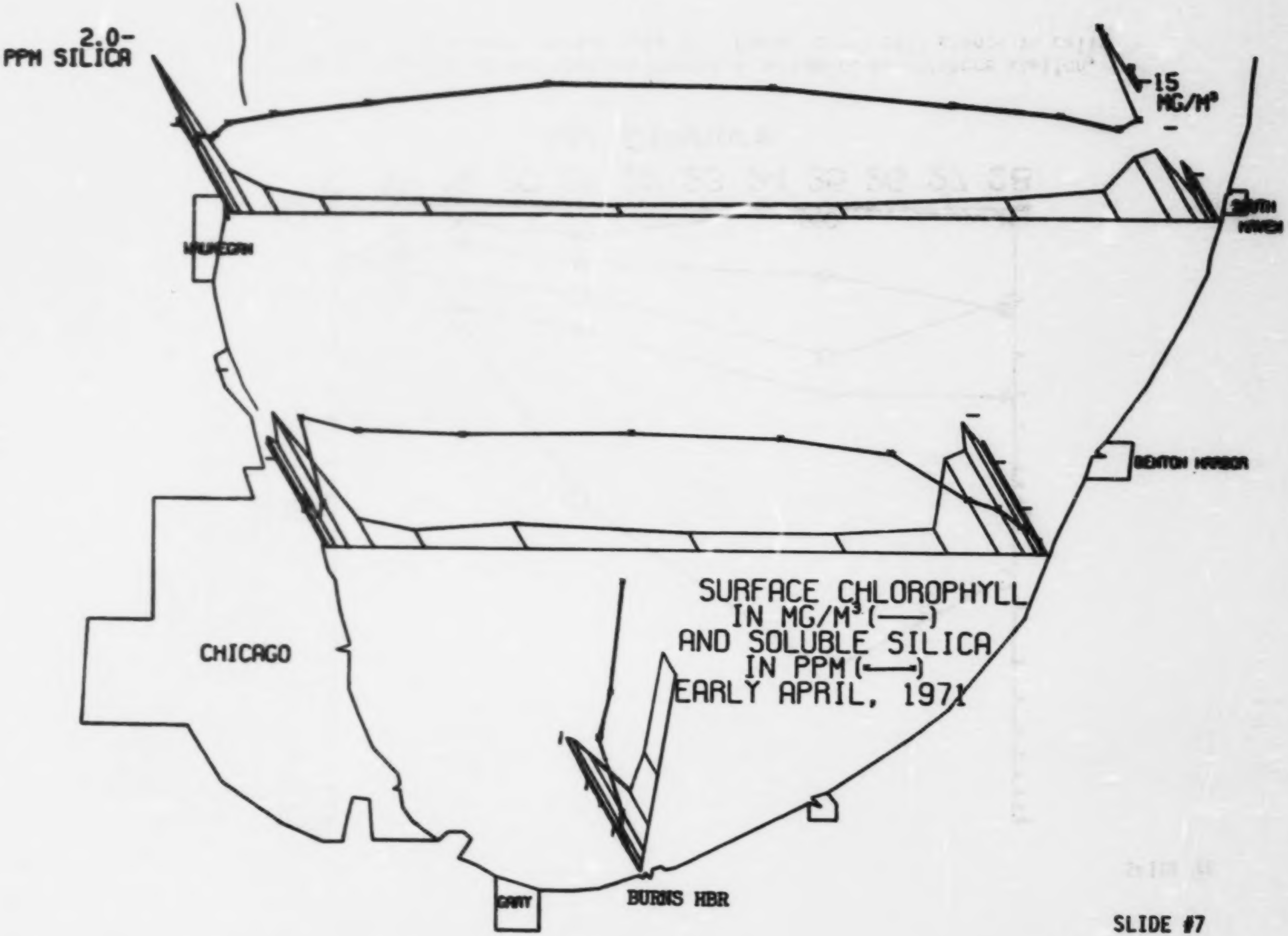


Slide 5. Results of nutrient enrichment experiments at offshore station, July 1969. Experiment started July 17. Above, soluble SiO_2 in ppm.

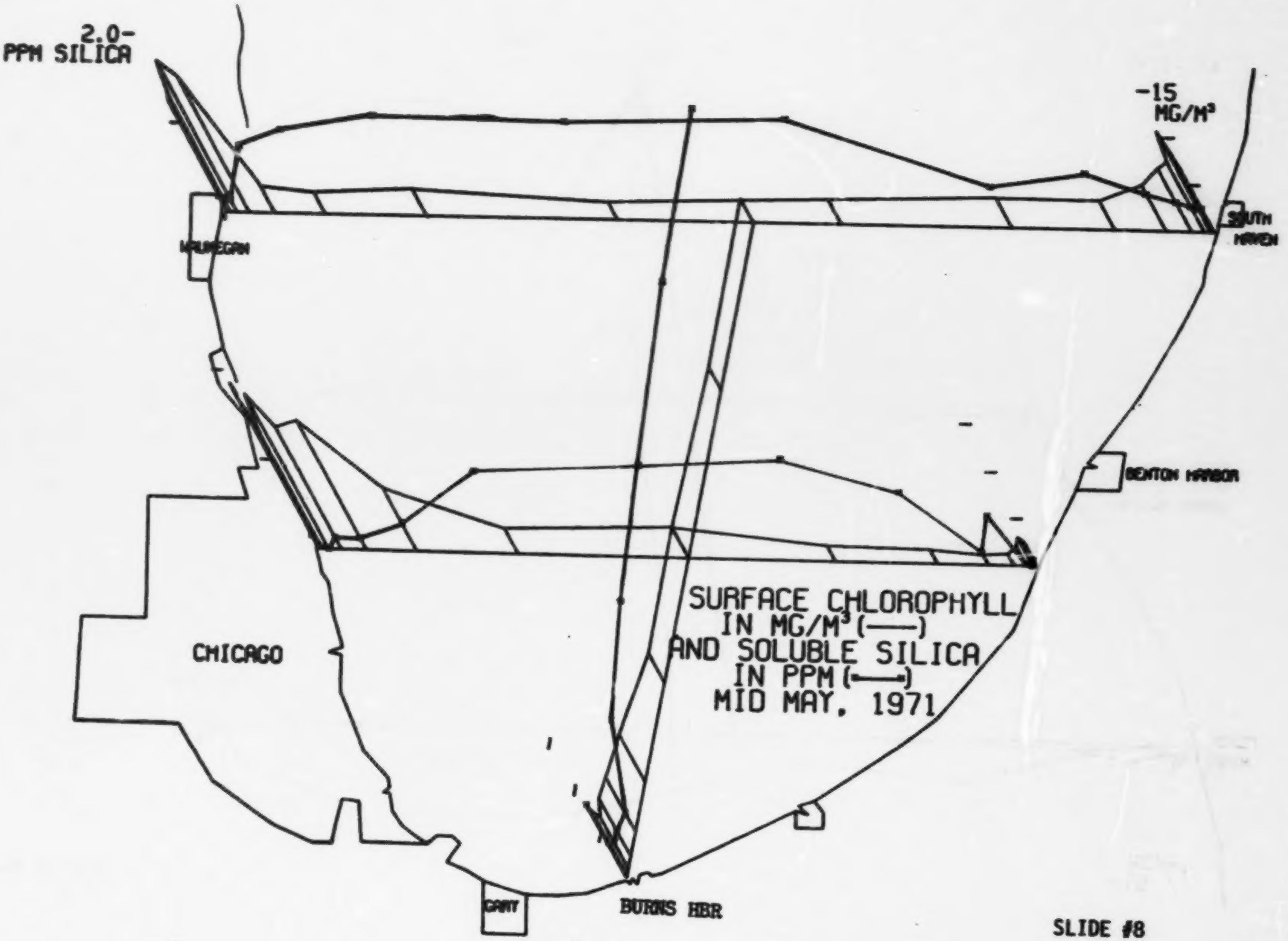
SLIDE #6



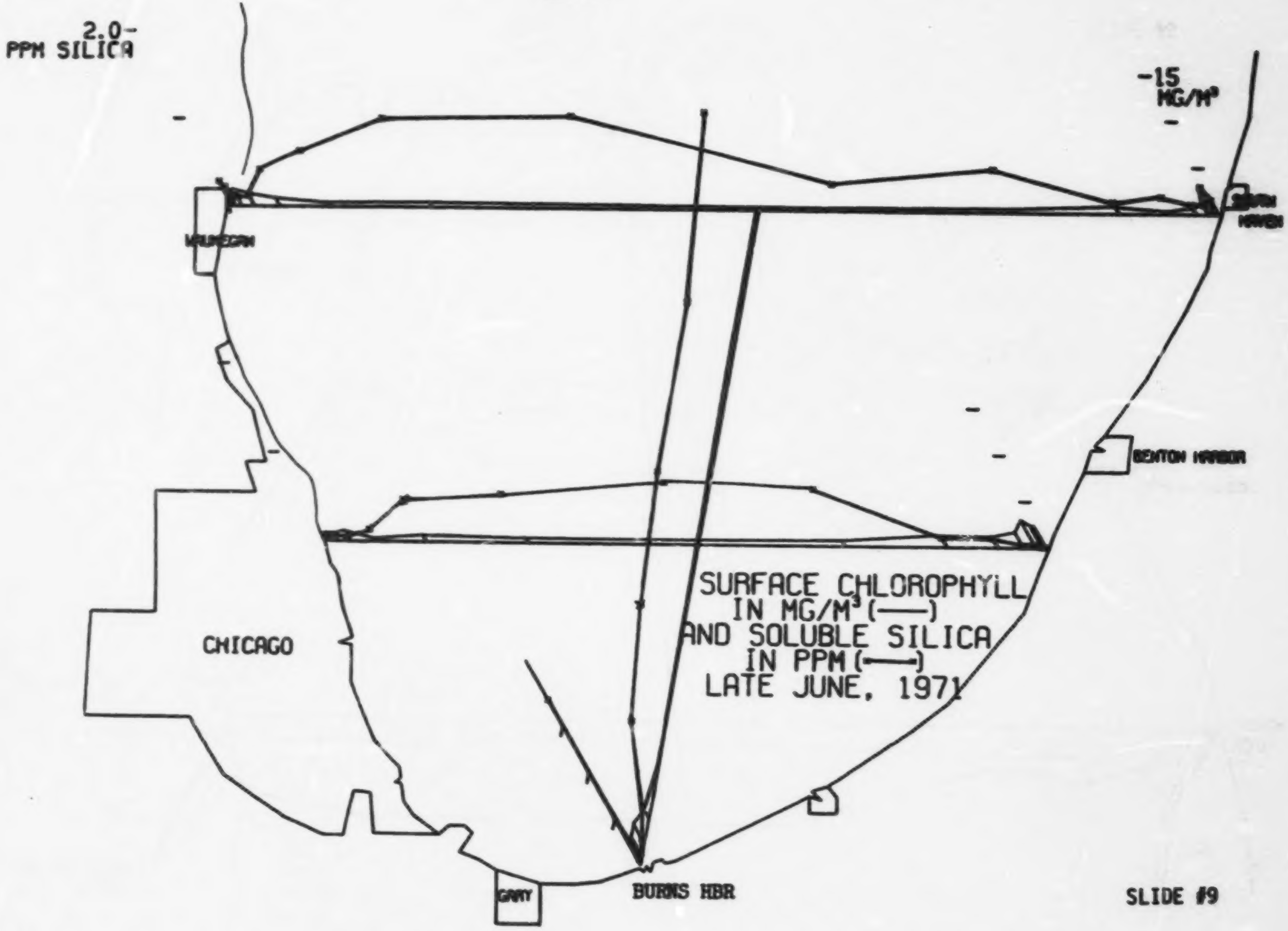
Slide 6. Results of nutrient enrichment experiments at offshore station, July 1969. Experiment started July 17. Above, total cell counts in cells per ml.


2.0-
PPM SILICA
-15
MG/M³
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR

SURFACE CHLOROPHYLL
IN MG/M³ (——)
AND SOLUBLE SILICA
IN PPM (•——•)
EARLY APRIL, 1971

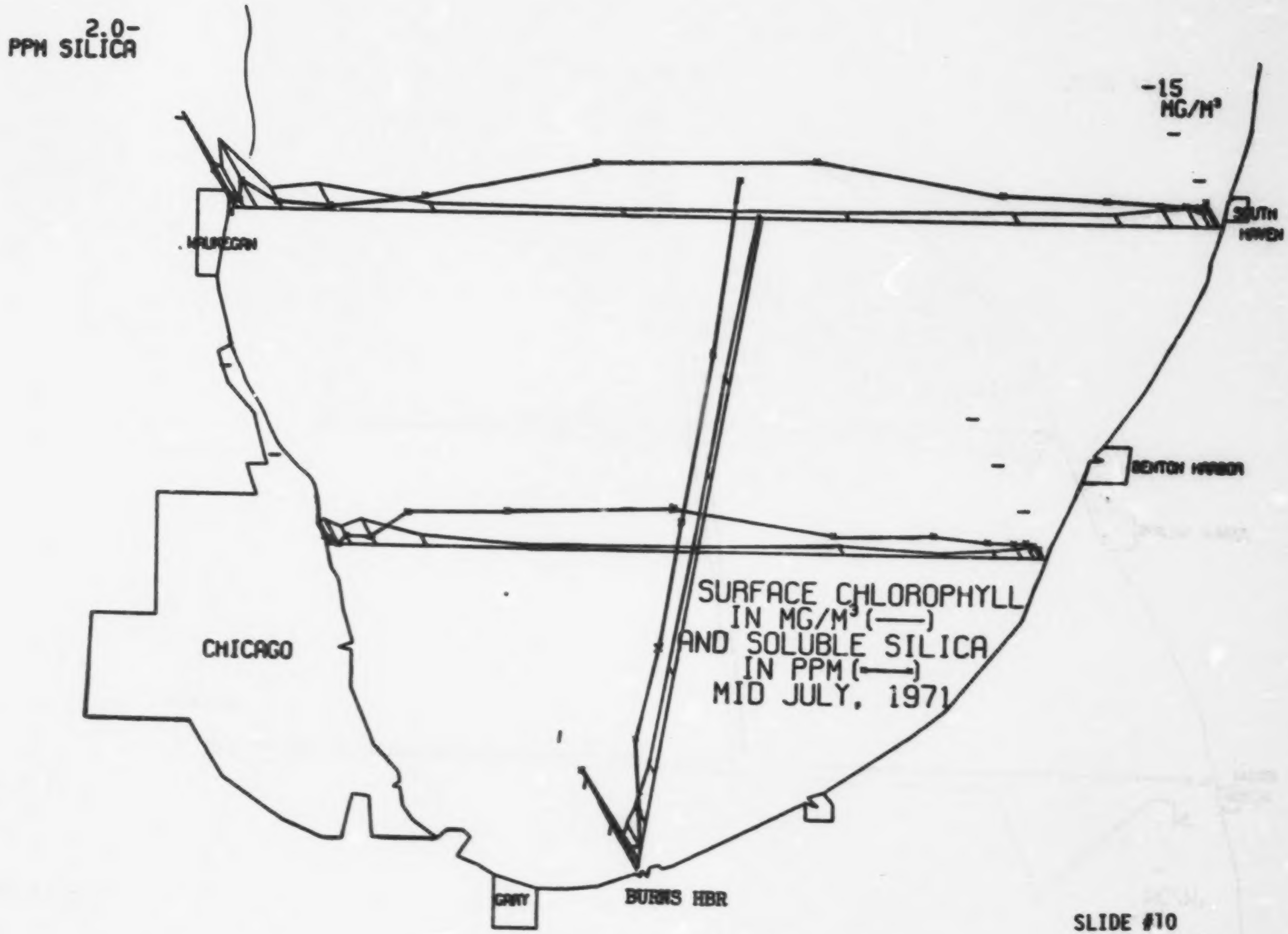

2.0-
PPM SILICA
-15
MG/M³
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR

SURFACE CHLOROPHYLL
IN MG/M^3 (——)
AND SOLUBLE SILICA
IN PPM (•——•)
MID MAY, 1971


2.0-
PPM SILICA
-15
MG/M³
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR

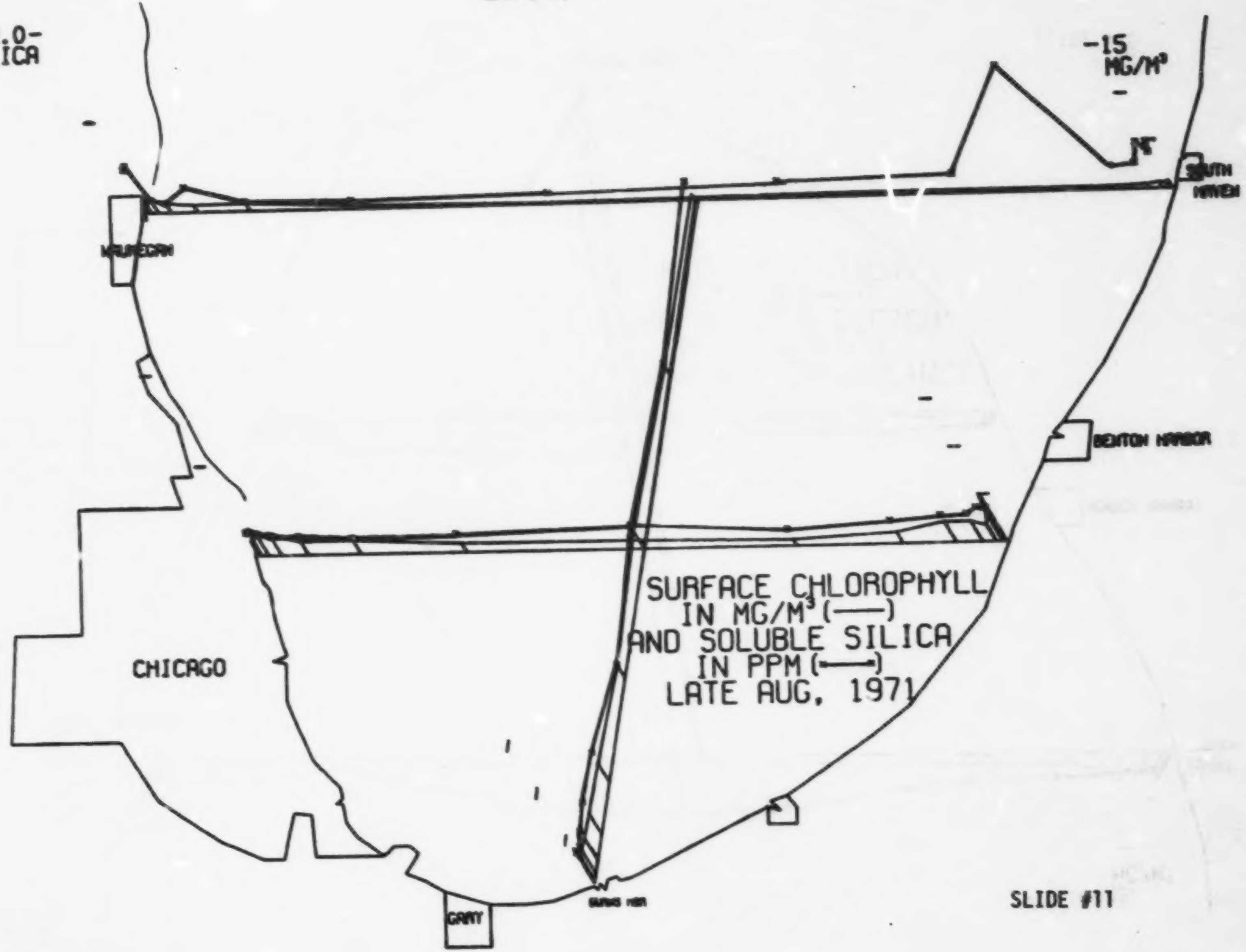
SURFACE CHLOROPHYLL
IN MG/M^3 (——)
AND SOLUBLE SILICA
IN PPM (•—•)
LATE JUNE, 1971

SLIDE #9



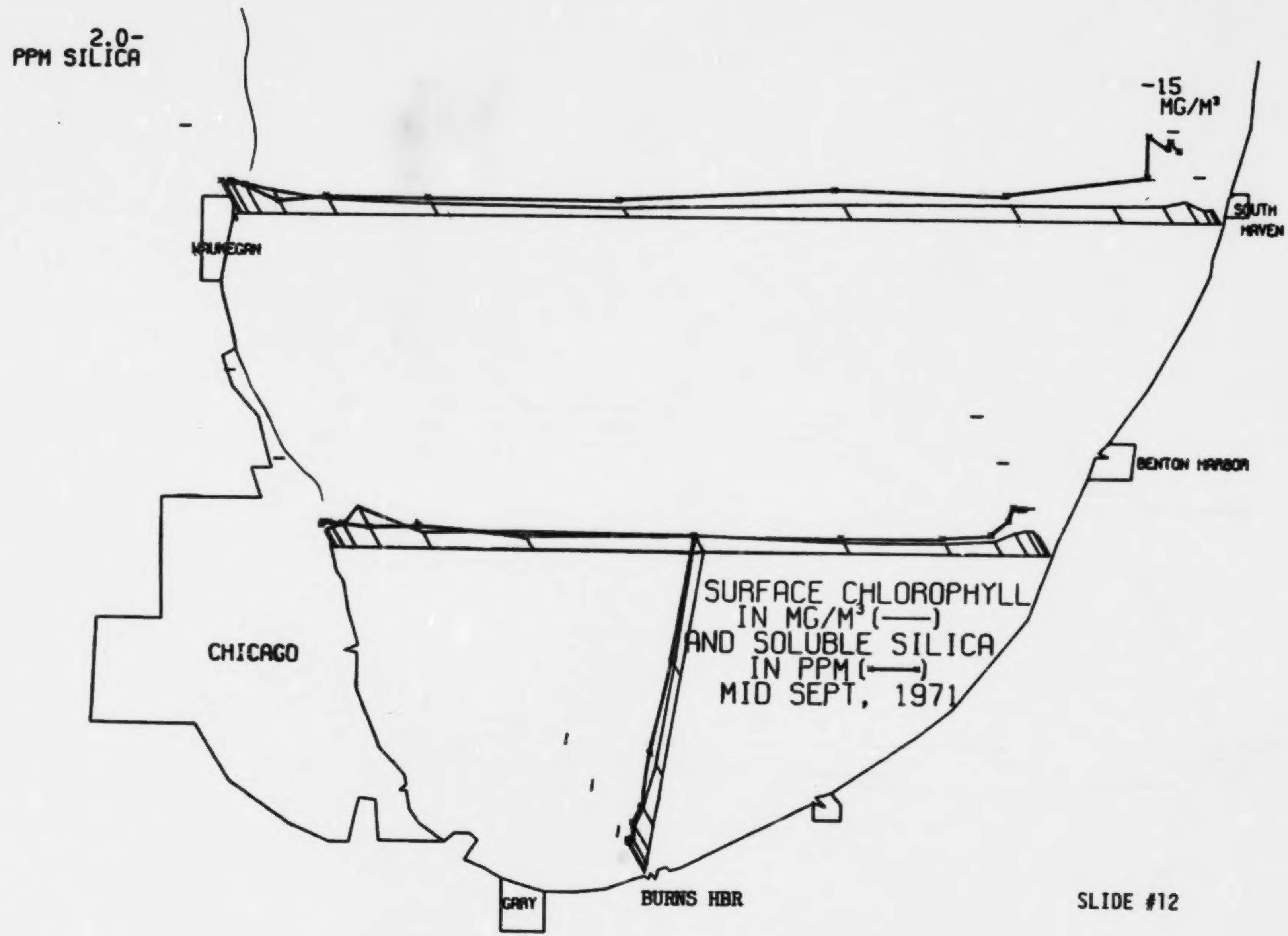
SURFACE CHLOROPHYLL
IN MG/M³ (——)
AND SOLUBLE SILICA
IN PPM (•——•)
MID JULY, 1971

SLIDE #10


2.0-
PPM SILICA
-15
MG/M³
SOUTH HAVEN
WAUKEGAN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR

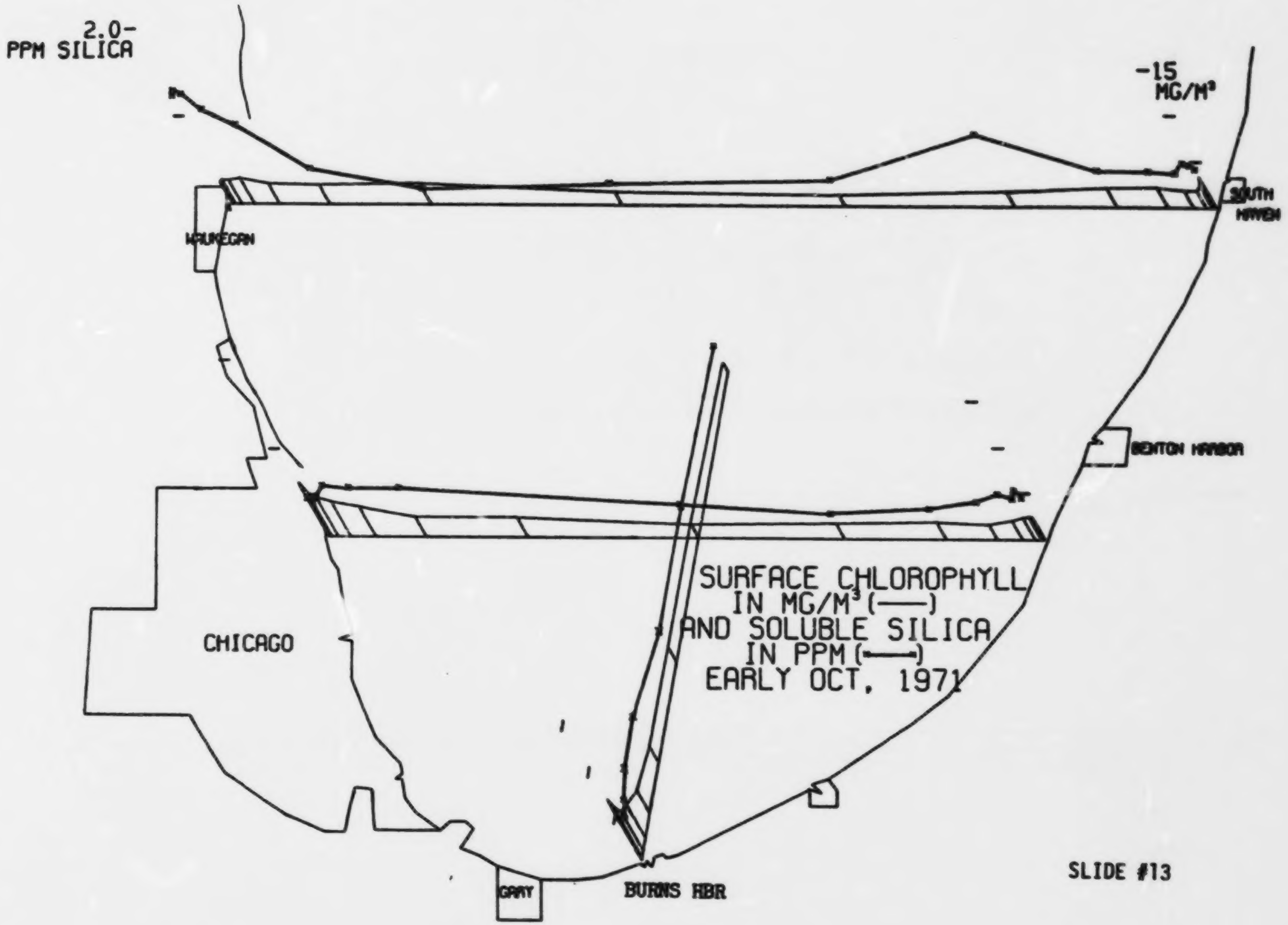
SURFACE CHLOROPHYLL
IN MG/M³ (——)
AND SOLUBLE SILICA
IN PPM (•—•)
LATE AUG, 1971

SLIDE #11



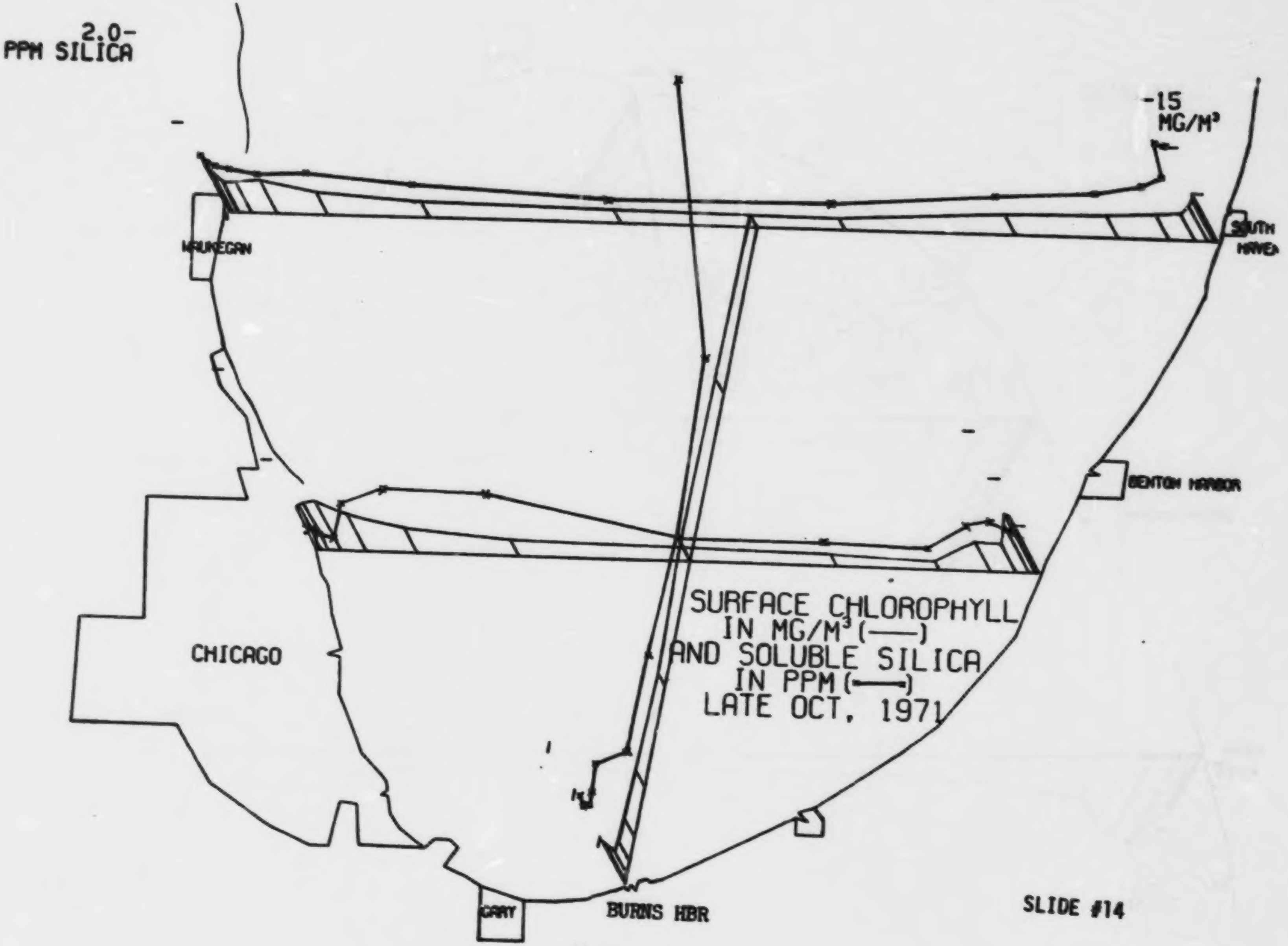
SURFACE CHLOROPHYLL IN MG/M^3 (——) AND SOLUBLE SILICA IN PPM (•—•) MID SEPT, 1971

2.0-
PPM SILICA
-15
MG/M^3
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR



2.0-
PPM SILICA
-15
MG/M³
SOUTH HAVEN
WAUKEGAN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR

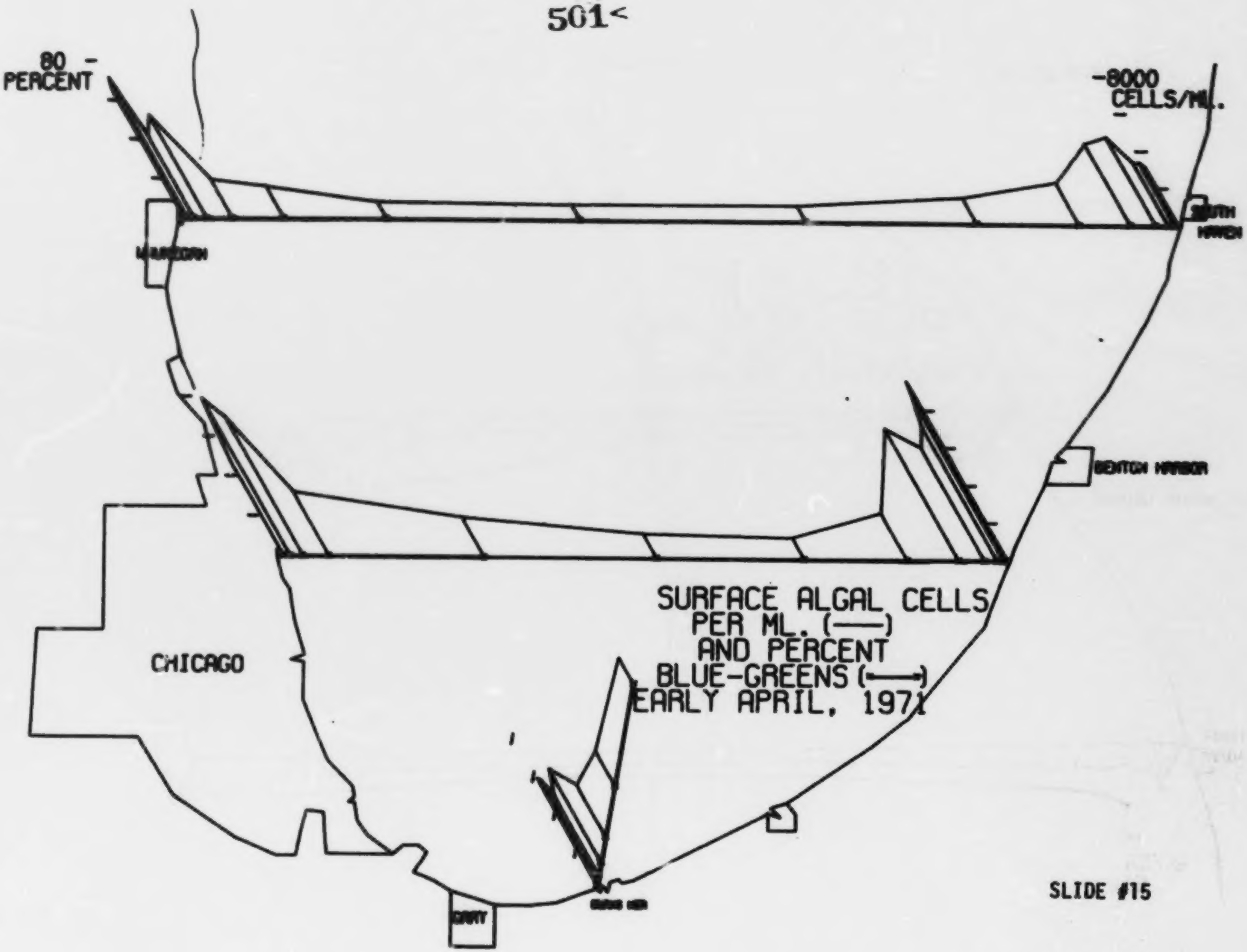
SURFACE CHLOROPHYLL
IN MG/M³ (——)
AND SOLUBLE SILICA
IN PPM (•—•)
EARLY OCT, 1971


2.0-
PPM SILICA
-15
MG/M³
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR

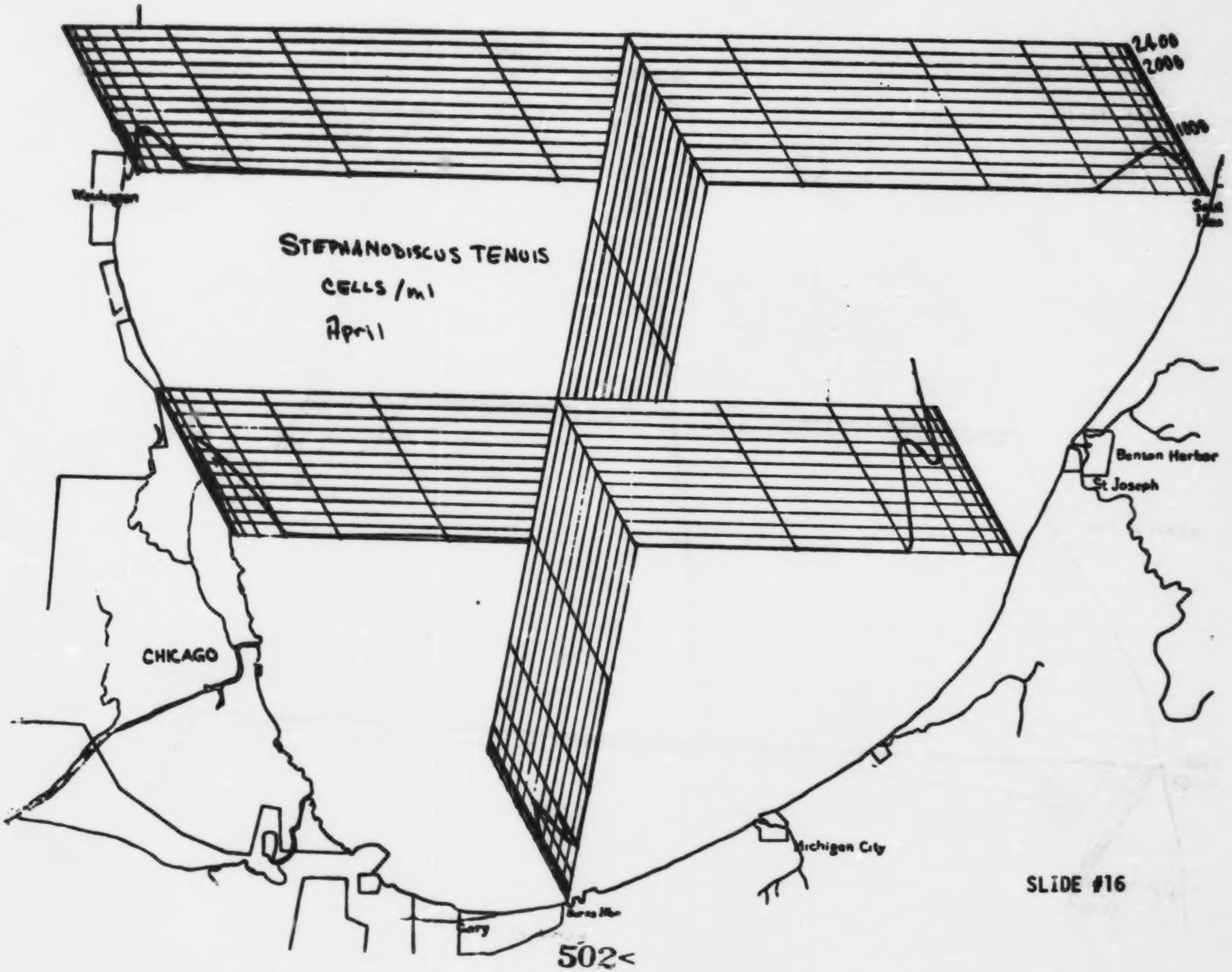
SURFACE CHLOROPHYLL
IN MG/M³ (——)
AND SOLUBLE SILICA
IN PPM (•——•)
LATE OCT, 1971

SLIDE #14

500<


80 -
PERCENT
-8000
CELLS/ML.
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY

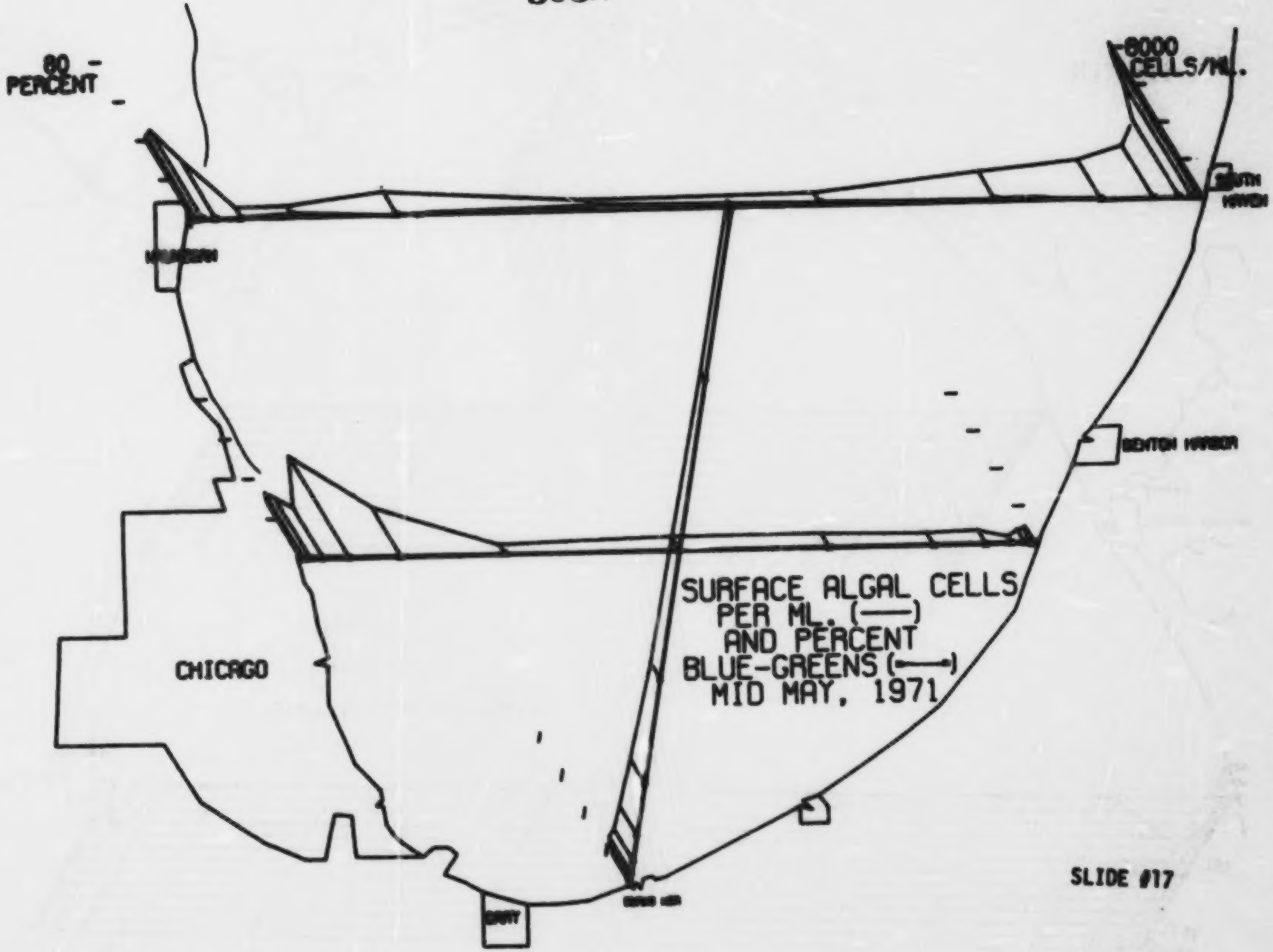
SURFACE ALGAL CELLS
PER ML. (——)
AND PERCENT
BLUE-GREENS (•——•)
EARLY APRIL, 1971



STEPHANODISCUS TENUIS
CELLS/ml
April

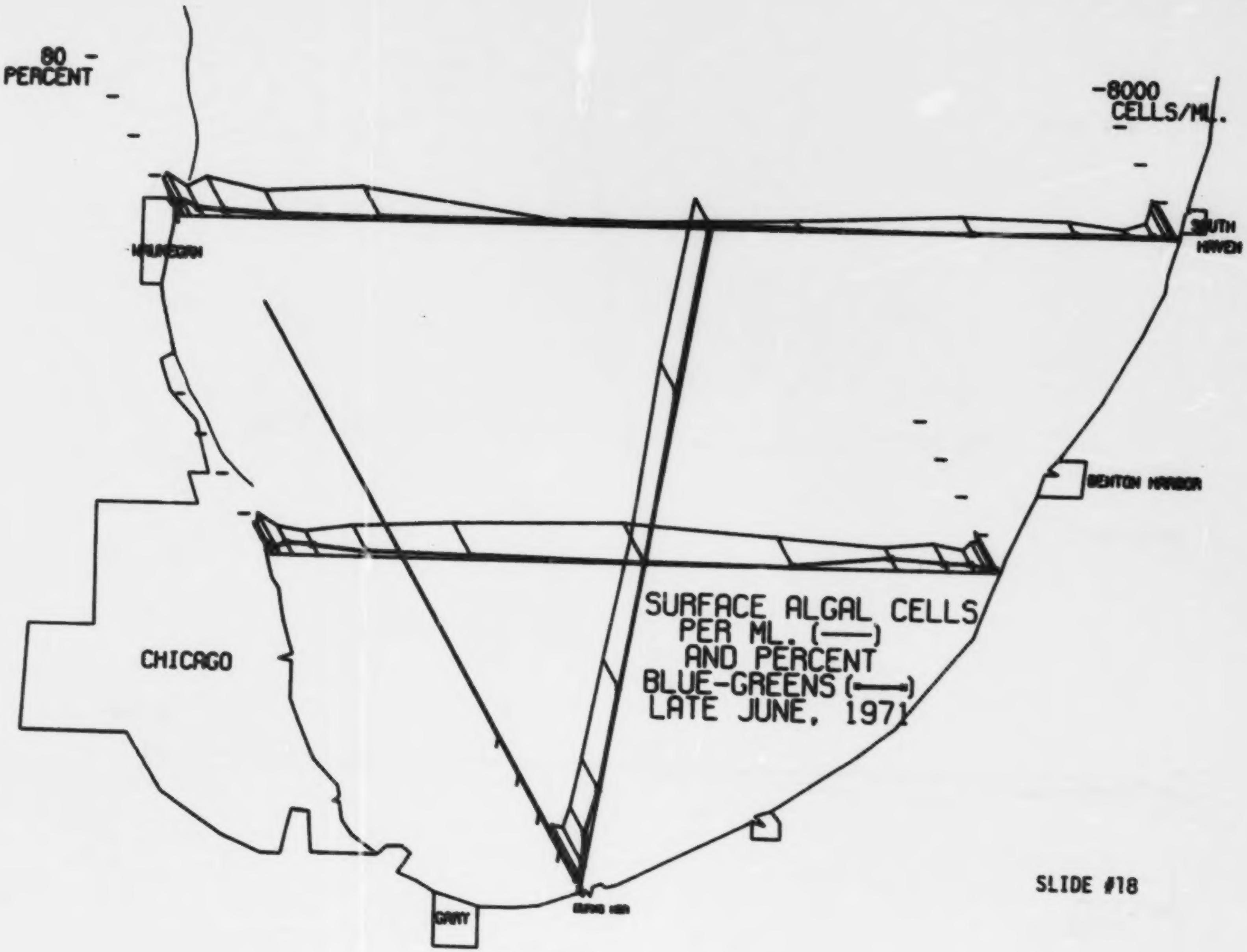
SLIDE #16

503<


80 -
PERCENT
-8000
CELLS/ML.
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY

SURFACE ALGAL CELLS
PER ML. (——)
AND PERCENT
BLUE-GREENS (•——•)
MID MAY, 1971

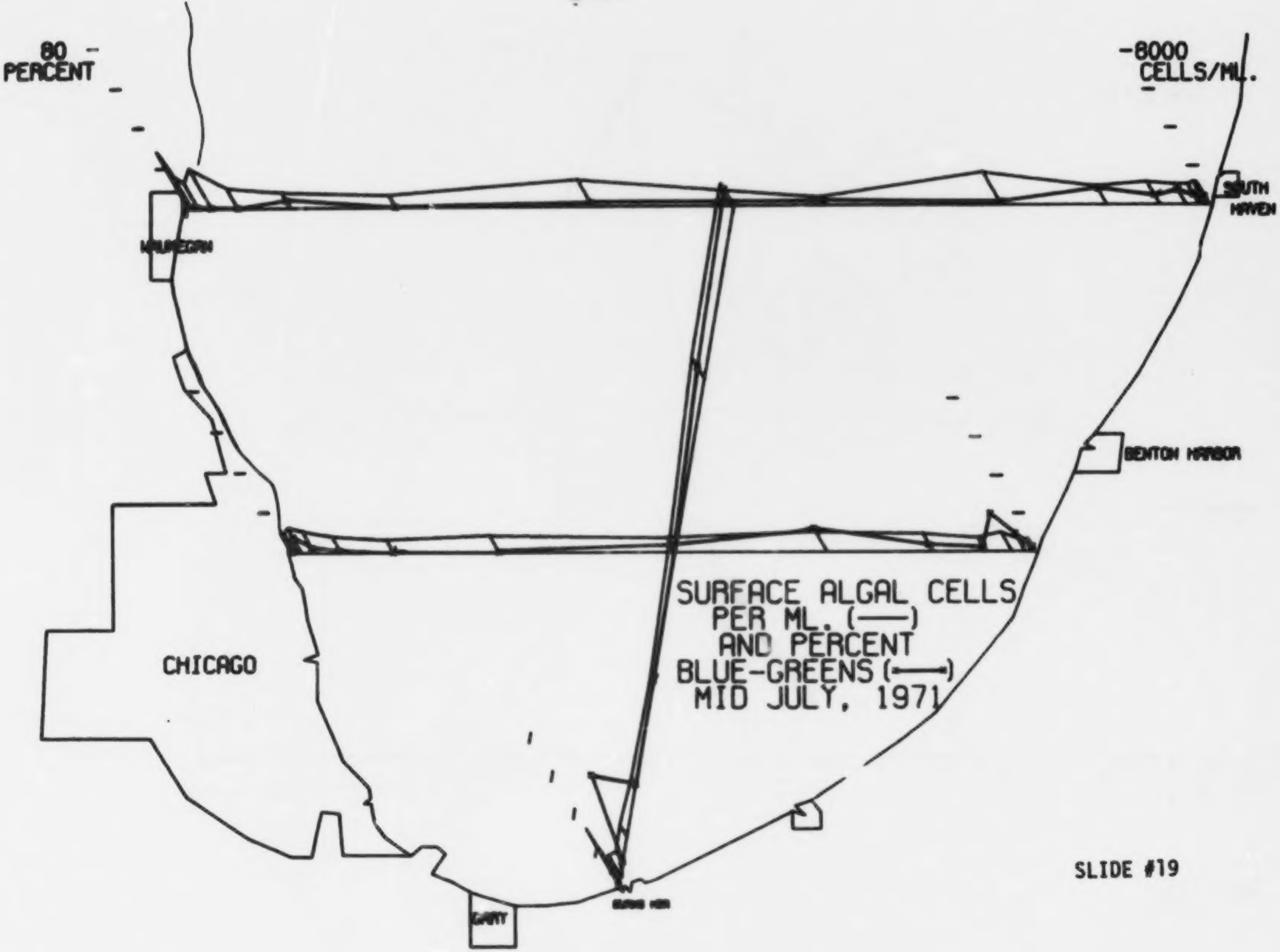
SLIDE #17



80 -
PERCENT
-8000
CELLS/ML.
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY

SURFACE ALGAL CELLS
PER ML. (——)
AND PERCENT
BLUE-GREENS (•——•)
LATE JUNE, 1971

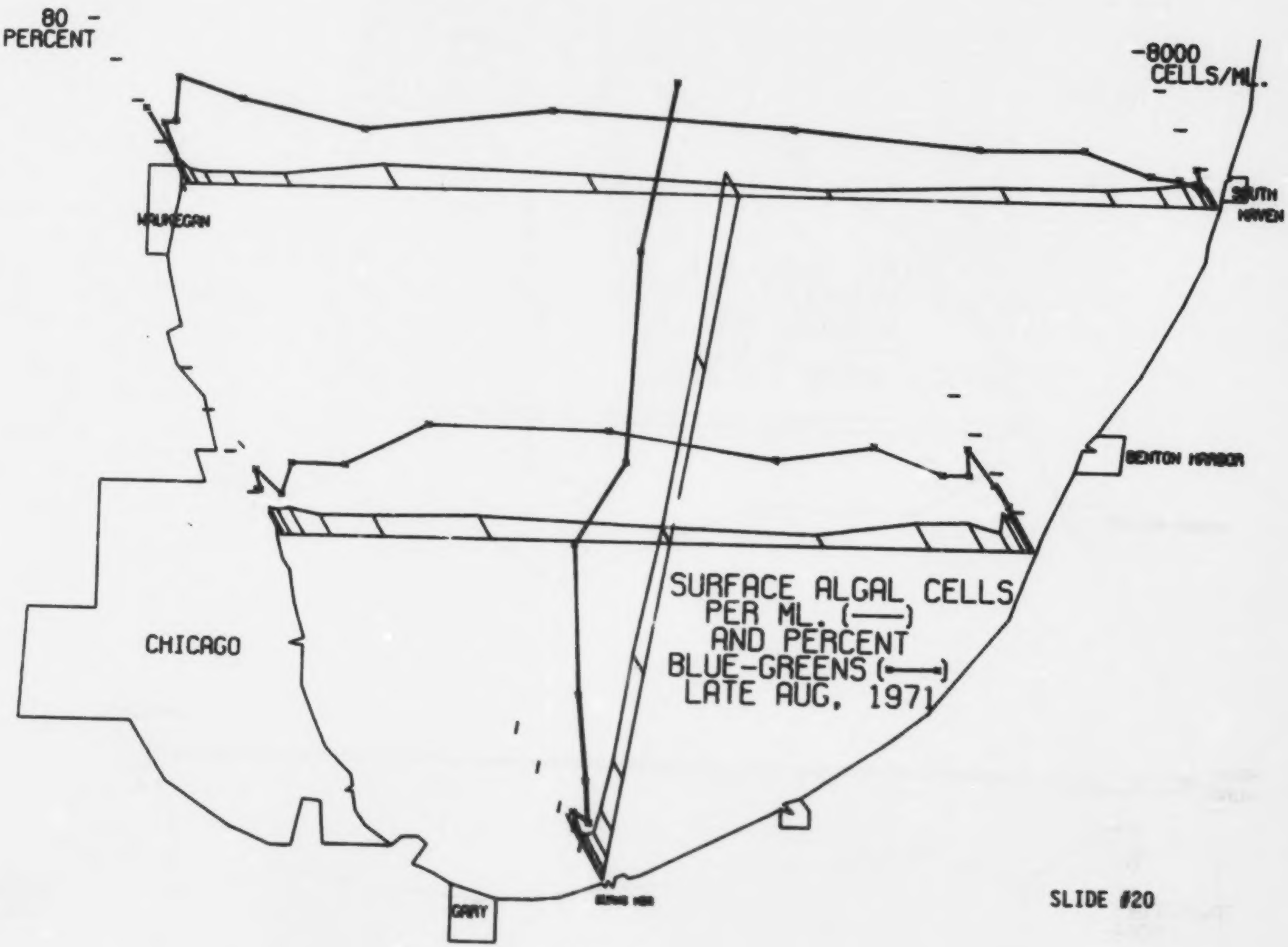
SLIDE #18



SURFACE ALGAL CELLS
PER ML. (——)
AND PERCENT
BLUE-GREENS (•—•)
MID JULY, 1971

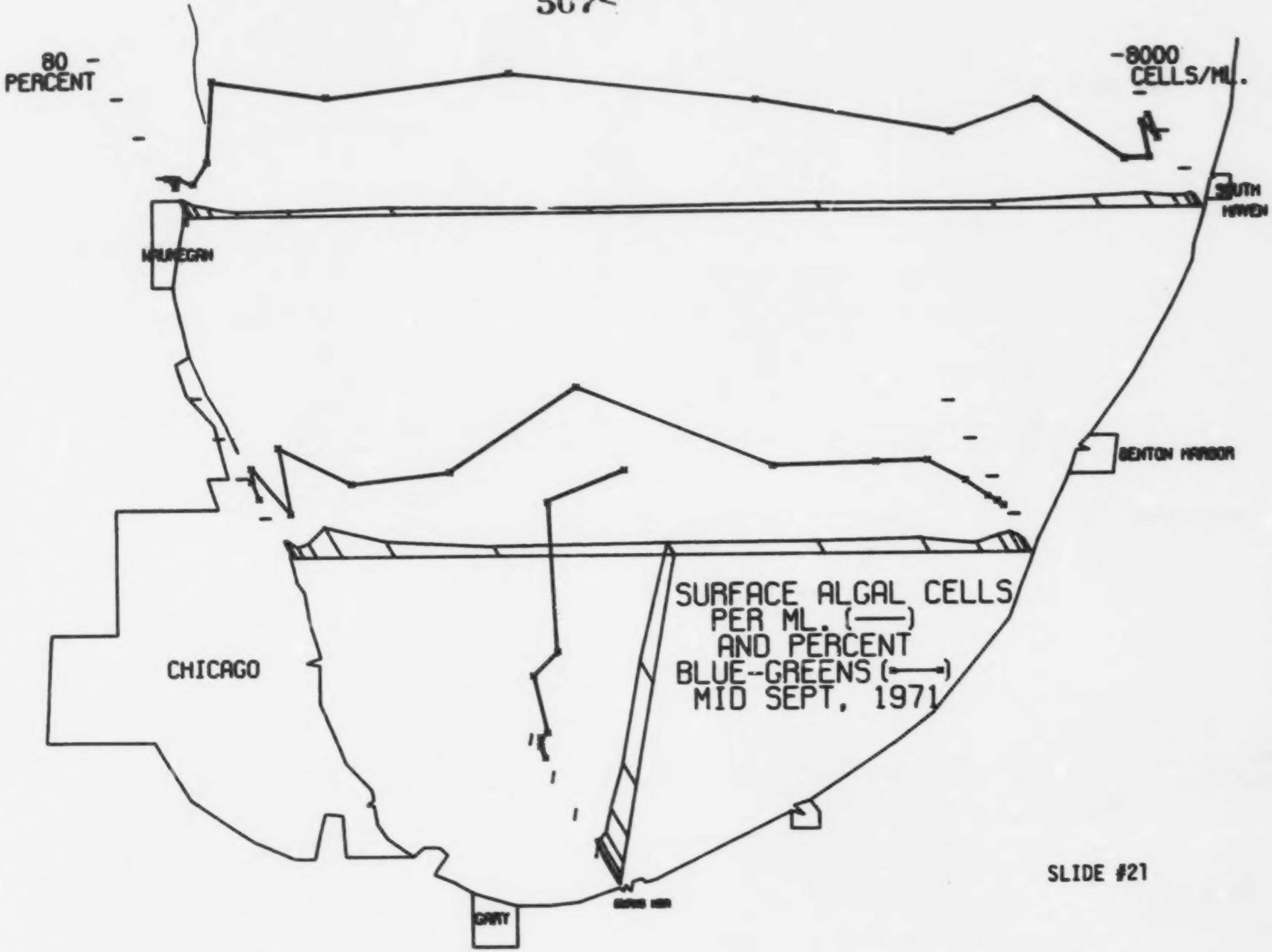
80 -
PERCENT
-8000
CELLS/ML.
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY

SLIDE #19


80 -
PERCENT
-8000
CELLS/ML.
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY

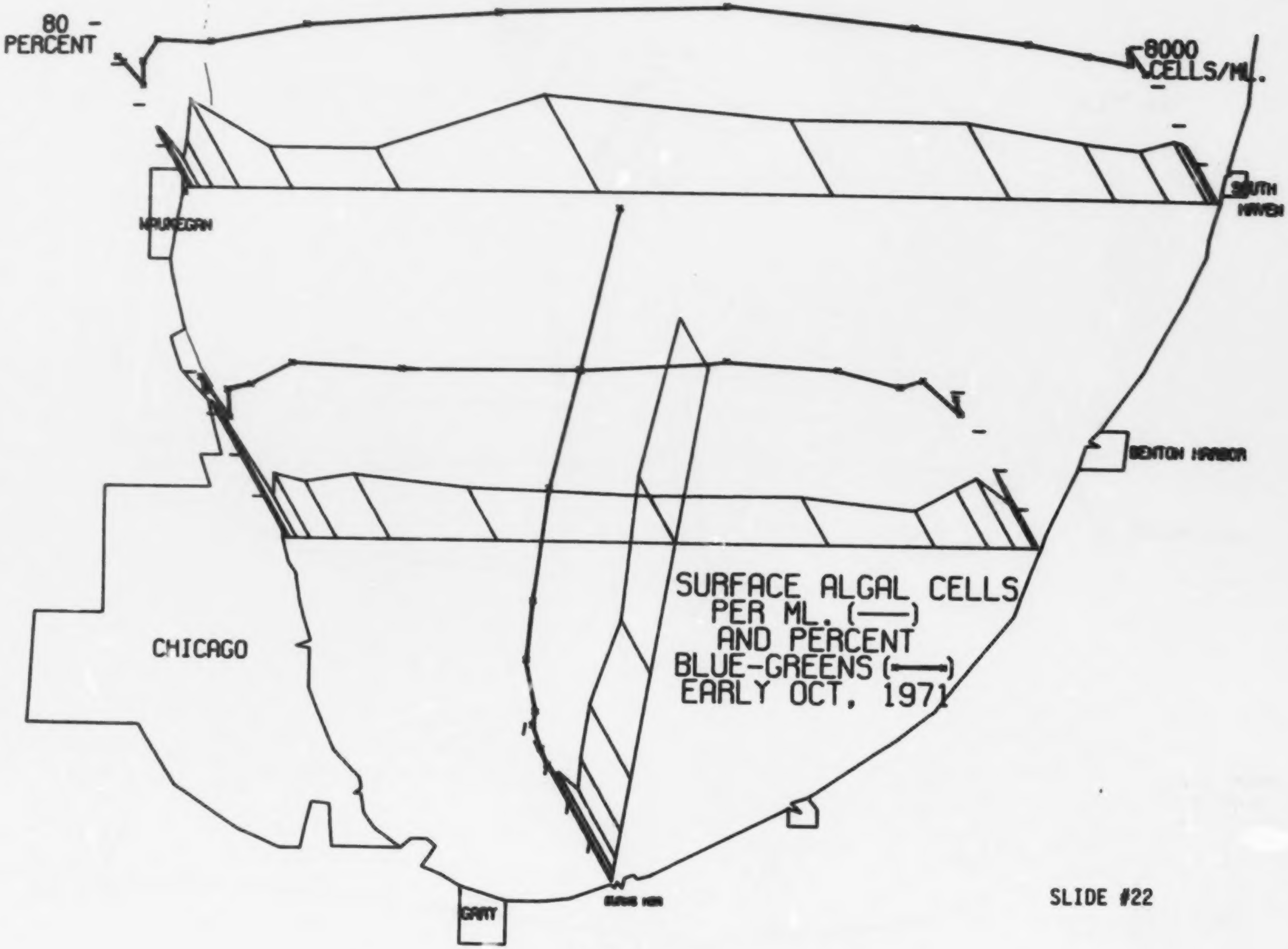
SURFACE ALGAL CELLS
PER ML. (——)
AND PERCENT
BLUE-GREENS (•——•)
LATE AUG, 1971

SLIDE #20


80 -
PERCENT
-8000
CELLS/ML.
SOUTH HAVEN
WAUKEGAN
BENTON HARBOR
CHICAGO
GARY

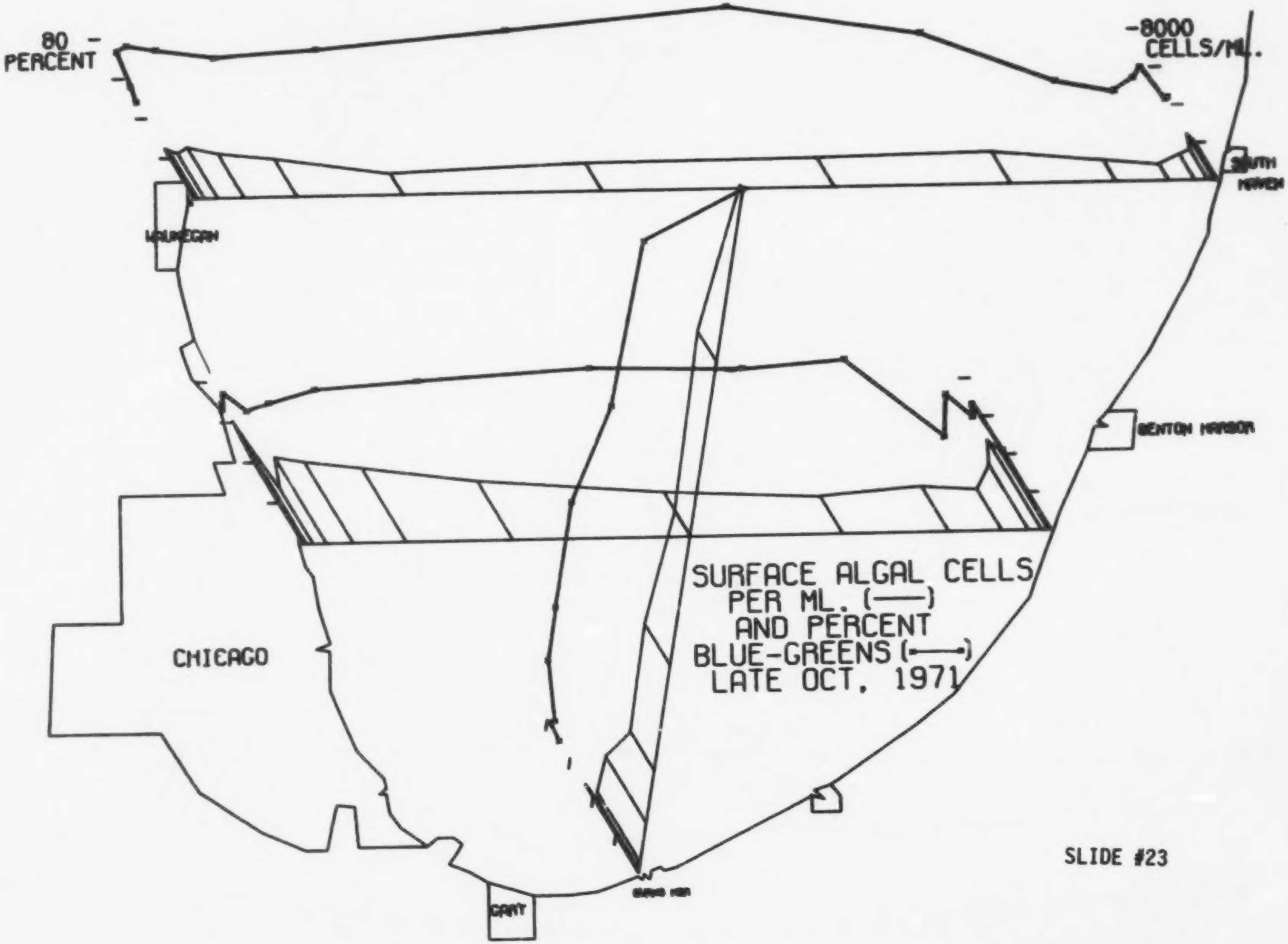
SURFACE ALGAL CELLS
PER ML. (——)
AND PERCENT
BLUE-GREENS (•——•)
MID SEPT, 1971

SLIDE #21


80 -
PERCENT
8000
CELLS/ML.
WAUKEGAN
SOUTH HAVEN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR

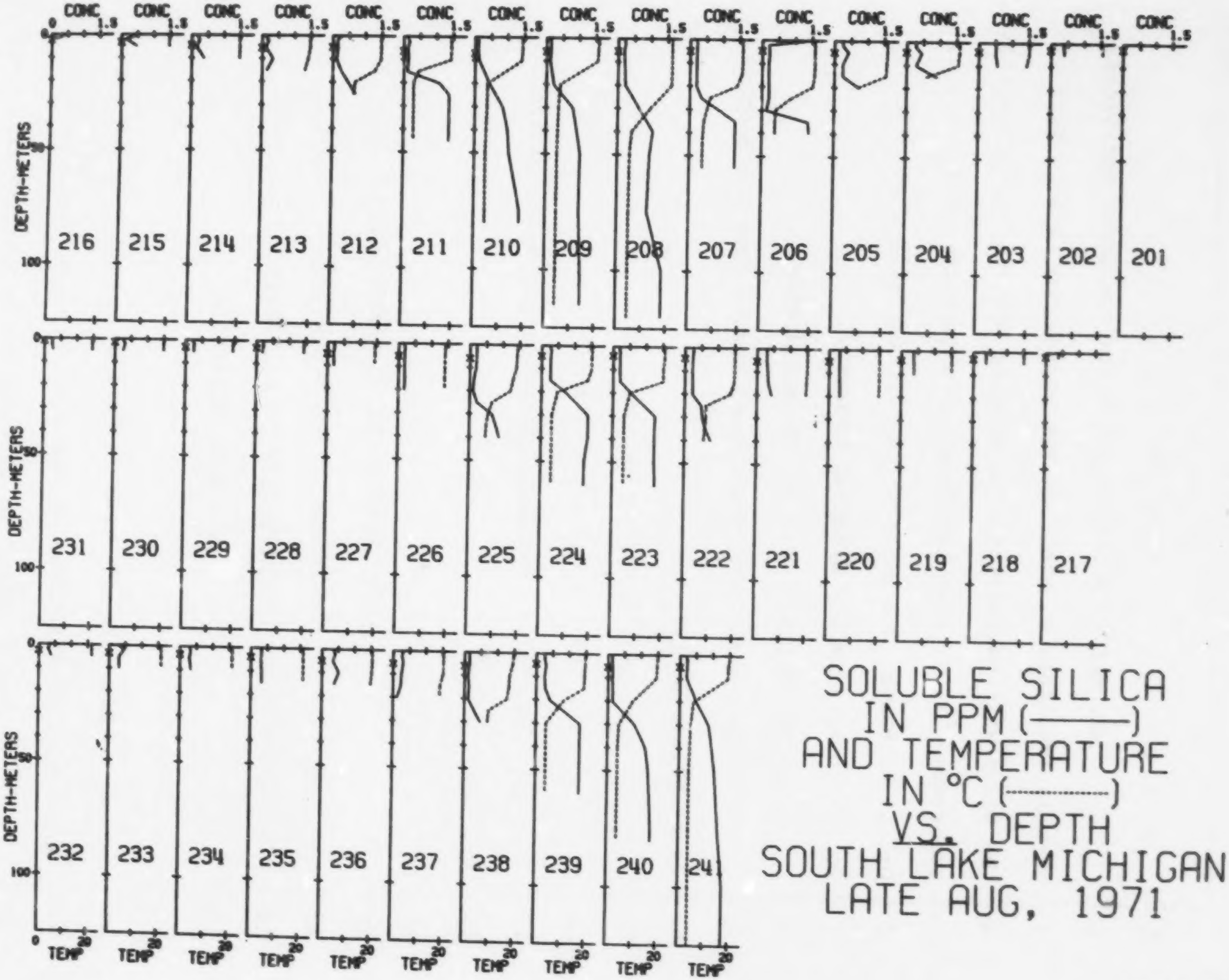
SURFACE ALGAL CELLS
PER ML. (——)
AND PERCENT
BLUE-GREENS (•——•)
EARLY OCT, 1971

SLIDE #22


80 -
PERCENT
-8000
CELLS/ML.
SOUTH HAVEN
WAUKEGAN
BENTON HARBOR
CHICAGO
GARY
BURNS HBR

SURFACE ALGAL CELLS
PER ML. (——)
AND PERCENT
BLUE-GREENS (•——•)
LATE OCT, 1971

SLIDE #23



SOLUBLE SILICA
IN PPM (———)
AND TEMPERATURE
IN °C (-----------)
VS. DEPTH
SOUTH LAKE MICHIGAN
LATE AUG, 1971

MR. MAYO: I understand there are three additional parties available to speak to the phosphorus issue. Each of the three will be leaving this evening and won't be available tomorrow: Dr. G. Fred Lee from the University of Wisconsin, Dr. E. P. Barth, EPA Research Center, Corvallis; and Mr. Dan Galloway from Dow Chemical Company.

MR. MILLER: And Mr. Thomas Dustin.

MR. MAYO: And Mr. Thomas Dustin from the Indiana Izaak Walton League.

Dr. Lee, how much time --

DR. LEE: About 15 minutes.

MR. MAYO: Will you introduce yourself, please, Dr. Lee?

STATEMENT OF DR. G. FRED LEE,
PROFESSOR OF WATER CHEMISTRY,
UNIVERSITY OF WISCONSIN,
MADISON, WISCONSIN

DR. LEE: My name is Fred Lee, Professor at the University of Wisconsin at Madison.

What I wanted to do today is to discuss with you some of the recent work that we have been doing on modeling the behavior of phosphorus in lakes, particularly to apply some of the models we have developed in some other lakes to the Lake Michigan situation.

Let's go to the first slide, please.

... Slide ..

I will not be reading; I will assume that this will go directly into the record as it stands. Don't try to read along.

MR. MAYO: We will introduce the statement as if read.

DR. LEE: I will only be hitting highlights from the statement.

(The document referred to above follows in its entirety, and reproductions of the slides used were unavailable for publication.)

The University of Wisconsin

WATER CHEMISTRY LABORATORY
MADISON, WISCONSIN 53706
262-2470
AREA CODE 608

September 25, 1972

Francis Mayo
U.S. Environmental Protection Agency
Region V
1 North Wacker Drive
Chicago, Illinois 60606

Dear Mr. Mayo:

At the recent Lake Michigan Enforcement Conference, I presented a paper entitled, "Phosphorus, Water Quality and Eutrophication of Lake Michigan." During my presentation, I asked that a copy of the paper be entered into the record. Subsequent to that presentation, I have received several additional comments on the paper from Tom Maloney, EPA Corvallis, and others who have suggested minor changes in the paper which would help clarify various statements in the paper. I have made these changes and have enclosed a corrected version of this paper. None of the changes have any effect on the overall conclusions presented at the conference.

I, therefore, request that in order to provide the best possible presentation in the Conference Proceedings, the enclosed paper be substituted for the original paper that was submitted on Tuesday, September 19, as part of my presentation.

Please call me to answer any questions about this request. Thank you for your assistance.

Sincerely yours,

G. Fred Lee

G. Fred Lee
Professor of Water Chemistry

GFL/lm

Phosphorus, Water Quality and Eutrophication of Lake Michigan*

by
G. Fred Lee
Professor of Water Chemistry
University of Wisconsin
Madison, Wisconsin 53706

Introduction

Considerable attention has been recently focused on the eutrophication of Lake Michigan. The experiences of excessive fertilization of Lake Erie and other parts of the Great Lakes, such as Lake Michigan's Green Bay, have prompted water pollution control officials at the federal and state levels to take steps to try to control excessive fertilization of Lake Michigan. The states bordering on Lake Michigan and the Federal Water Pollution Control Administration (now the Environmental Protection Agency) adopted regulations in 1968 that required that at least an 80% reduction of the total phosphorus entering a waste water treatment plant that discharges to Lake Michigan or one of its tributaries shall be accomplished by December, 1972. A recent check with the water pollution control officials in the various states bordering on Lake Michigan shows that many of their municipal waste water treatment plants are already achieving phosphorus reduction of at least this amount and the rest of them are expected to achieve this type of reduction during 1972 or shortly thereafter.

More recently, the U.S. and Canada have agreed to a 1.0 mg/l total phosphorus effluent standard as part of the Great Lakes Water Quality

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*Presented at Lake Michigan Enforcement Conference, September 1972.

Agreement, April 1972, which applies to Lakes Erie and Ontario. The conferees at the September 19-21 Lake Michigan Enforcement Conference may adopt a policy of a 1.0 mg/l P effluent standard for all waste water discharges to Lake Michigan or one of its tributaries.

It is reasonable to ask what the effect might be of the 80% removal of phosphorus from point sources on water quality in Lake Michigan. This paper considers the question and proposes a model for the expected effect of the immediately pending phosphorus input reduction and further urbanization of the Lake Michigan watershed on water quality in the lake.

Current Water Quality in Lake Michigan

The current water quality in Lake Michigan can best be described in terms of three broad areas of the lake. These are the specific areas with localized degradation, nearshore waters, and the open waters of the lake. Lake Michigan has several areas of highly localized, significantly degraded water quality. These areas are generally harbors or other areas of the lake where there is restricted circulation with open waters of the lake. In almost every case, the degradation is the result of discharge of large volumes of partially treated waste waters into a relatively small volume which has restricted circulation with the lake. One of the most notable examples of this type of situation is in southern Green Bay. Sridharan and Lee (1972) and Sridharan (1972) have recently completed a study of the effects of the 80% removal of phosphorus from the waste waters entering southern Green Bay on water quality in the bay. A review of the findings of this study will be presented in a subsequent section of this paper.

The second area of the lake which should be considered in any review of water quality is the nearshore zone. The nearshore zone varies in width from nonexistent to several miles. The physical characteristics of the nearshore zone waters likely depend on the morphology of the shore area, the position in the lake, the season, the wind direction and intensity and other factors. The characteristics of the nearshore zone will likely change from day to day, depending on climatic conditions at any one location. The justification for separating the lake into a nearshore zone as separate from the open waters is that a large lake such as Lake Michigan has strong longshore currents which tend to slow down the rate at which a pollutant introduced near the shore is mixed into the open offshore waters. It is extremely important to point out that the nearshore zone is not an isolated body of water from the open waters of the lake. There is significant interchange of waters between the nearshore and open waters. Simple consideration of the volume of tributary waters to the lake shows that there is a minimum of transport from the nearshore to the open waters at least equal to the river inputs. For some parts of the nearshore area, especially along the western shore, the upwelling that occurs in the nearshore zone must be added to the net transport of waters from the zone to the open waters of the lake. The exchange of water between nearshore and open waters is further enhanced by wind-induced mixing, especially during storms.

One of the frequently cited physical phenomena that is alleged to inhibit mixing of nearshore waters and open waters of the lake is the thermal bar. There are numerous statements in the literature (Department of the Interior, 1970) that the thermal bar inhibits mixing of nearshore and open waters. Generally, these statements are based on a lack of mixing across the thermal bar as evidenced by changes in the concentrations of suspended solids, planktonic organisms and certain chemicals at the surface. However, the nature of the thermal bar is such that it is a zone of intense mixing between the open water and nearshore waters. The thermal bar exists because of mixing of waters with a temperature below 4°C from the open water with waters of a temperature above 4°C from the nearshore waters to form the denser 4°C which sinks at the "bar." This mixing of open waters at the "bar" with the nearshore waters results in a net transport of chemicals and heat from the nearshore to the open waters of the lake at the bottom of the "bar."

The third area of the lake which should be considered in any discussion of water quality is the the open water. This area may be further subdivided into the north and south basins and the epilimnion and hypolimnion during the warm months of the year. Water quality in the open waters generally shows some evidence for accelerated eutrophication, especially in the southern basin.

Stoermer and Yang (1969) (1970) reported that the open waters of Lake Michigan are showing increasing abundance of diatoms which are generally considered to be associated with enriched waters. Further, there appears to be an increase in the appearance of green and blue-green algae in the lake. Schelske and Stoermer (1972) and Schelske, et al. (1971) have reported that the growth of algae and specifically diatoms is generally limited in the open waters and at least in some parts of the nearshore waters by the available phosphorus content. Powers and Ayers (1967) have noted that the silica content of the Chicago Water Works intake has decreased over the past 36 years, 1926-1962. They extrapolated this data to a zero silica content in 1976 during periods of intense diatom blooms. This decrease in silica has been reported by Schelske and Stoermer (1972) to be due to increasing phosphorus input which stimulates diatom growth, thereby reducing the silica content of the waters because of the formation of the silicious shells.

Unpublished data made available to the author by the City of Chicago, Department of Water and Sewers has shown that the silica content of the raw water used by the city of Chicago has not continued to decrease in the period 1962-1970. In fact, the silica has leveled off at a concentration of about 1.0 mg/l during this period of time. Examination of the data from 1926-1970 shows that the leveling off of the silica in the water supply intake began about 1950. Since that time silica levels have remained essentially constant. This leveling off would be expected based on the aqueous environmental chemistry of silica, where the rates of weathering of various silicate minerals are often dependent on the silica concentrations of the water. Therefore, while on an average, the silica content of the waters would not be expected to reach "zero" by 1976, i.e. - the extrapolated value based on the previously noted trends - it should be emphasized that during periods of algal blooms the silica content of the water could become sufficiently low to limit diatom growth. Various conservation activist groups (BPI, 1972) have predicted that Lake Michigan is on the edge of a major change due to the fact that when the silica decreases to the point that it is insufficient to support additional diatom growth, there should be a rapid change in the dominant type of algae, with a switch from diatoms to greens and blue-greens. It is this type of shift in algal dominance that is of concern due to the fact that generally, green and blue-green algae cause a greater water quality deterioration per unit concentration than do diatoms. It should be noted, however, that diatoms do cause serious water quality problems for water plant operators, greatly increasing the cost of treatment by reduced filter runs and by causing taste and odors in the drinking water (see Palmer, 1959).

The nearshore waters of Lake Michigan are also experiencing excessive planktonic algal growth (Stoermer, et al., 1971); however, the shift from diatoms to greens and blue-greens appears to be less than in the open waters, according to Copeland and Ayers (1972). It appears that the nearshore waters tend to maintain the silica concentrations at a higher level and therefore still support the dominance of diatoms. These higher silica concentrations are related to increased rates of silica generation, upwelling of deeper waters, input from rivers and municipal and industrial wastes and weathering processes.

The nearshore zone has problems of growth of attached algae, particularly Cladophora. Increased growths of these attached algae are occurring in those regions where there is a suitable substrate. During strong storms, the Cladophora tend to be broken off from their holdfast and accumulate along the shore in thick mats. These mats can become serious problems for water supply intakes due to clogging of the intakes, requiring fairly frequent cleaning.

The water quality problems of the highly localized degraded areas, such as Green Bay, are the result of large waste inputs into parts of the lake with restricted circulation. The problems in these areas include excessive oxygen demand due to the discharge of partially treated municipal and industrial wastes, high suspended solids due to wind-induced mixing of sediments and discharges from waste water sources, as well as the transport of erosional material from the land to the lake. Some harbors show significant concentrations of oil and other chemicals which cause serious degradation of water quality from an aesthetic, recreational and aquatic life point of view.

Risley (1968) has discussed many of the water quality problems of Lake Michigan. This discussion should be consulted for further details of these problems.

From the above discussion, it is readily apparent that there already exists significant water quality deterioration in the nearshore zones of Lake Michigan due to excessive nutrient input. Further, the data available show disturbing trends in the numbers and types of algae present in the open waters of the lake, which ultimately could lead to a significant deterioration of water quality in Lake Michigan as a whole. However, as noted earlier, the water pollution control agencies of the states bordering on Lake Michigan and the federal government (EPA) have established an 80% phosphorus removal from waste water inputs which shall be essentially complete as of December, 1972. The important questions to be asked about this situation are:

1. Will the steps taken in 1968 bring about a significant reduction in phosphorus input to the lake and thereby result in a measurable increase in water quality?
2. What will be the rate of recovery of Lake Michigan as a result of the December, 1972 limitation of phosphorus input?
3. What will be the expected increases in phosphorus load to this lake due to further urbanization of the lake's watershed?

The following sections of this paper consider each of these questions.

Magnitude of Phosphorus Input Reduction

In August, 1972 the Phosphorus Technical Committee of the Lake Michigan Enforcement Conference (Zar, 1972) presented a report summarizing the current information on phosphorus inputs to Lake Michigan. Data from their report are presented in Table 1. Examination of Table 1 shows that this committee estimated that the direct point waste water sources contribute 3.9 million pounds per year of phosphorus to Lake Michigan, while the indirect point waste water sources contribute 9.3 million pounds of phosphorus per year to this lake. This gives a total for waste water contributions to Lake Michigan of 13.2 millions pounds per year. The direct point sources include the cities that discharge their waste water directly to the lake, while the indirect point sources include those municipalities that discharge their waste waters to a tributary of the lake. The Phosphorus Technical Committee estimated the phosphorus input from waste water sources assuming that 10 mg/1 is the typical phosphorus concentration in the influent of sewage treatment plants and that 3.65 pounds of phosphorus per person per year is the typical loading for domestic waste waters and that each person used 120 gallons per day. In some instances they had actual effluent data on the phosphorus discharged to the lake from waste water sources. A combination of these two approaches was used to estimate the values listed in Table 1. The Phosphorus Committee reported that the erosion and other diffuse sources generally range from 1-7 million pounds per year for a generalized total load to Lake Michigan of 14-20 million pounds per year. However, actual data were available for the phosphorus load from the various tributaries in 1969. Using this data, a total load of 17.1 million pounds per year was found.

This Committee also estimated the combined sewer overflow phosphorus load to Lake Michigan as being about 5% of the total untreated waste waters. This figure results in an estimate of 0.8 million pounds per year of phosphorus is contributed to Lake Michigan due to combined overflow.

Table 1

Estimated Phosphorus Sources for Lake Michigan*

Source	Load (million lbs/yr)
Direct waste water sources	3.9
Indirect waste water sources	9.3
Total waste water sources	13.2
Erosion and other diffuse sources	1 to 7
Generalized total load excluding precipitation and dustfall	14 to 20
1969 total load (estimated & measured) excluding precipitation and dustfall	17.1
Combined sewer overflow	0.8
Precipitation and dustfall on surface of Lake Michigan**	1.1

*after report of Phosphorus Technical Committee to the Lake Michigan Conference (Zar, 1972).

**estimated by the author based on data of Kluesener (1972) and Thompson (1972).

One factor not mentioned in the Phosphorus Committee report is the phosphorus input from precipitation directly on the lake's surface. While very little data are available on this topic, studies by the Canada Centre for Inland Waters (Thompson, 1972) have found that across Canada an average concentration of total phosphorus in precipitation is 97 ug/l P. The CCIW studies show that about 60 ug/l P is in the soluble orthophosphate form which would be assumed to be available for algal growth.

Kluesener (1972) and Kluesener and Lee (1972), in a study of the phosphorus content of precipitation and dustfall in Madison, Wisconsin, found that about 110 pounds of phosphorus was derived from atmospheric sources per square mile per year. They also found that there were about 13 lbs/yr/sq mi of total phosphorus present in precipitation in the city of Madison. It is felt that these values are high compared to what is likely found for Lake Michigan and it has been assumed that a value of 50 pounds per square mile per year of phosphorus would be contributed to the lake from dustfall and precipitation, with most of this in a form that is not readily available for algal growth. The area of Lake Michigan is 22,400 square miles (Hutchinson, 1957), giving a total estimated phosphorus input from precipitation and dustfall on the lake's surface of 1.1 million pounds per year.

Table 2 presents a summary of the phosphorus loading to Lake Michigan using the 1971 data assuming no waste water phosphorus removal other than that normally achieved, the 1973 loading assuming that 80% of the waste water phosphorus is removed in accord with the recommendations of the 1968 Lake Michigan Enforcement Conference, and the 1973 loading assuming the 1.0 mg/l P effluent standard which may be adopted by the conferees at the Lake Michigan Enforcement Conference in September, 1972. The 1.0 mg/l P

Table 2

Estimated Phosphorus Loading of Lake Michigan

Source	Load (million lbs/yr)		
	1971	1973 80% removal	1973 90% removal*
Waste waters	13.2	2.6	1.3
Diffuse sources	3.0	3.0	3.0
Combined sewer overflow	0.8	0.8	0.8
Precipitation and dustfall	1.1	1.1	1.1
Total	18.1	7.5	6.2
Percent reduction from 1971 values	-	58	66

*equivalent to 1 mg/l in effluent

effluent standard is taken to be equivalent to a 90% removal of phosphorus from the waste waters, since it is generally found and assumed for these calculations that typical domestic waste waters contain 10 mg/l of phosphorus. 1971 was chosen as the year for comparison rather than 1972 since many of the waste water treatment plants located on Lake Michigan or its tributaries had initiated phosphorus removal during that year. Fetterolf (1972) stated that the projections of the Michigan Water Resources Commission are that, by December, 1972, Michigan waste water treatment plants in the Lake Michigan basin will remove 65% of the phosphorus load to Lake Michigan attributable to municipal and industrial sources. By December, 1973, this figure will increase to 77.1%. Schraufnagel (1972) has stated that, as of December, 1972, the State of Wisconsin will be accomplishing an overall 80% removal of phosphorus from waste water point sources.

There seems to be some controversy on whether conventional domestic waste water treatment plants can readily achieve a 90% removal of phosphorus. For some of the very large plants located on Lake Michigan it appears to be possible at a relatively small increase in cost. However, for some of the more moderate or smaller size plants, the experience thus far indicates that they may have some difficulty achieving 85% phosphorus removal. In order to achieve 90% removal it may be necessary to greatly increase the cost normally associated with phosphorus removal at waste water treatment plants.

The 1971 data use a total of 18 million pounds per year as the current loading, which is the same as the 1969 actually measured values minus the atmospheric input. The diffuse source estimate is based on the 1969 data and is assumed to be constant at 3 million pounds per year for each of the conditions considered in Table 2. Studies currently underway at the University of Wisconsin Water Chemistry Program and at other institutions are designed to estimate the amounts of phosphorus derived from diffuse sources that may actually become available in a lake. Preliminary results show that a few percent of the phosphorus from diffuse sources such as rural and urban runoff can become available in lake systems. It should be further noted that in general the phosphorus present in domestic waste water effluents is available for algal growth at the point of discharge.

One of the factors that is not properly reflected in the Phosphorus Technical Committee Report is that phosphorus arising from waste water discharges to the head waters of a tributary to Lake Michigan is counted equally with phosphorus directly discharged to the lake. This is an extremely conservative approach since there can be little doubt that the phosphorus discharged directly to the lake from waste water sources is essentially all available for algal growth, while the phosphorus discharged to tributaries of the lake, especially near the head waters such as the Upper Fox River, would, by the time it reaches Lake Michigan, be largely in a form that is not available for algal growth. In the passage down the Fox River through Lake Winnebago, followed by a series of impoundments in the Lower Fox River and Green Bay, much of this phosphorus has passed through one or more aquatic plant systems, such as algae and macrophytes. Each passage through an aquatic plant system results in a certain part of the phosphorus becoming refractory, i.e., unavailable for algal growth. While the actual amount of refractory phosphorus formed in any tributary would be very difficult to determine, it is certain that in a situation such as the Fox River in Wisconsin, a waste water discharge near the head waters may have very little effect on water quality in Lake Michigan as compared to a waste water discharge of a similar magnitude directly to the lake.

Examination of Table 2 shows that there will be a reduction in the total phosphorus load to Lake Michigan from 18.1 to 7.5 million pounds per year when the 80% removal from waste water sources goes into effect in December, 1972. Using the 90% removal criteria (1.0 mg/l P in the effluent), the expected loading in 1973 would be 6.2 million pounds per year. This means that comparing the 1971 values to the 1973 values, there would be a 58% overall reduction in phosphorus input for the 80% removal criteria, while 66% overall reduction would occur with the 1.0 mg/l P effluent standard. Changing from 80% removal from waste waters to 90% removal results in almost a million pounds per year decrease in the phosphorus input to the lake and an additional 10% reduction in the total phosphorus load compared to the 1971 data.

It is of interest to compare these results to the effects of the removal of phosphorus from detergents. The only way that phosphorus in detergents will have a significant effect on the phosphorus loading to Lake Michigan is through affecting the amounts of phosphorus in combined sewer overflows. Assuming that 50% of the phosphorus present in domestic sewage effluent is derived from detergents, the loading for the combined sewer overflow will decrease from 0.8 to 0.4 million pounds per year as the total phosphorus load for the lake. From an overall point of view, assuming that the phosphorus loading to Lake Michigan will decrease to about 6 million pounds per year, and comparing the 1971 data to the 1973 1.0 mg/l P effluent standard, it is found that the net overall reduction will be 66%. Based on these calculations approximately two additional percent of phosphorus entering the lake could be removed by conversion of phosphate-builder detergents to phosphate-free detergents.

An additional benefit that will be derived from the conversion of detergents from phosphate-builders to nonphosphate-builders is a reduction in the cost of phosphate removal by municipal treatment works. Some of the treatment methods used for phosphate removal show a chemical dosage necessary to achieve a certain degree of removal dependent on the initial concentration of phosphorus in the waste waters. Reducing the phosphorus in the waste waters from 10 to 5 mg/l would result in a reduction in the chemical costs for phosphate removal. Because of the lack of information on the relationship between the reduction in treatment chemical dosages as a function of initial concentration, it is not possible to estimate the actual magnitude of the savings that would be derived from the switch from phosphate to nonphosphate detergents. It should be further noted, however, that the amount that might be saved by the public in terms of reduced quantities of treatment chemicals made possible by the switch would in part be offset by increased costs of manufacturing processes and types of chemicals used in the detergent products which were necessitated by the switch.

Within a few years there will be the virtually complete elimination of the combined sewer overflows. When this occurs, the overall percent reduction in phosphorus input for the 1973 90% removal criteria will increase from 66 to 70, compared to the 1971 estimated phosphorus loadings.

Expected Rate of Recovery of Lake Michigan Upon Phosphate Reduction

Sonzogni and Lee (1972) have recently presented results which show that it is unreasonable to expect that the rate of recovery of a lake upon the input reduction of a nonconservative element would follow the hydraulic residence time model often used. Instead, it is felt that it is much more appropriate to use a residence time model based on the chemical reactivity of the element under consideration. For phosphorus, a residence time can be computed based on the average total content of phosphorus in the lake and the average rate of phosphorus input. This residence time takes into account all of the various chemical reactions that occur in the lake which tend to transport phosphorus to and from the sediments. It is important to note that numerous studies have shown (see Sonzogni and Lee, 1972, and Lee, 1972) that the sediments of lakes tend to act as important sinks for phosphorus, in which very little of the phosphorus which is transported to them is recycled to the overlying waters. This would be especially true in a lake such as Lake Michigan. The studies currently underway by the author show that the primary source of the phosphorus that is recycled from the sediments is the mineralization of the algae. It appears that very little of the phosphorus present in inorganic iron and aluminum compounds is recycled in most natural water systems.

Using the concept of the phosphorus residence time and the data from the Phosphorus Committee (Zar, 1972), including the estimated input from precipitation and dustfall, a total input at this time of 18.1 million pounds per year of phosphorus and a total volume of Lake Michigan of approximately 5×10^{15} liters (Hutchinson, 1957) and, further, assuming an average phosphorus concentration in Lake Michigan of 0.01 mg/l P (Schelske, 1972), it is computed that the phosphorus residence time in Lake Michigan is in the order of six years. This is markedly different from the 30-year residence time for water molecules in the lake. Based on the model utilized by Sonzogni and Lee (1972) for the recovery of a lake after phosphorus input reduction, it would be expected that about three residence times would be needed to accomplish a 95% recovery of the lake to the new steady state phosphorus value. This means that in fifteen to twenty years from December, 1972, the lake should be at a new steady state phosphorus value. It should be further noted that this rate of recovery assumes that Lake Michigan is, at the present time, at a steady state phosphorus value. If this is not the case, then a slightly longer time of recovery would be needed to achieve a new steady state phosphorus after the December, 1972, phosphorus input reduction. The Phosphorus Technical Committee Report (Zar, 1972) presents data which show that, on the average, the total phosphorus concentration in the water supply intake of the Chicago Water Filtration Plant has been increasing at a significant rate during the past 15 years. This means that even if the phosphorus load were to be maintained constant at the 1971 values, it would likely take several years to achieve a new steady state phosphorus concentration. However, since this model utilizes an exponential recovery with the greatest rate of decrease during the period immediately following the input reduction, the fact that the phosphorus concentrations in the lake would be tending to increase due to the input of the past few years would likely be completely overshadowed by the dramatic drop in the total phosphorus input during 1972. This means that instead of having to wait 100 years for the lake to assume a new steady state concentration of phosphorus based on the hydraulic residence time model of Rainey (1967), which assumes a completely conservative behavior of the chemical, based on the more appropriate model the lake would assume a new steady state value within about 15-20 years from December, 1972.

It is further noted that the estimates by Baumgartner, as cited by Risley (1968), where "after careful evaluation of all data, he (Baumgartner) estimated that if no additional pollutants were permitted to enter Lake Michigan, it would take 1,000 years to reduce the pollutional concentration in the lake by 90%" are in significant error and completely neglect the consideration of the aqueous environmental chemistry of phosphorus in the Lake Michigan system.

This estimate of phosphorus residence time may be high for Lake Michigan as a whole, because some of the data on the total phosphorus present in the open waters of the lake show a total phosphorus content of less than 0.01 mg/l P. If a lower value of the total phosphorus content of the lake were used, it would reduce the phosphorus residence time to less than the six-year value computed on the basis of the 0.01 mg/l P average content of the lake.

Expected Effect on Water Quality in Lake Michigan

Since phosphorus is the key element limiting planktonic and attached algal growth in all parts of Lake Michigan (Zar, 1972) (Lee, 1972), with the exception of the southernmost part of Green Bay and possibly other locations near high phosphorus inputs (Sridharan and Lee, 1972), it is reasonable to expect that reducing the phosphorus input to this lake within the next year by 60-70% by advanced waste treatment methods should have a significant effect on water quality in Lake Michigan. This effect would be manifested to the greatest extent in the nearshore waters because phosphorus levels of these waters tend to be somewhat higher than the open waters of the lake. It is reasonable to expect that within a few years there will be an improvement in water quality in the open waters and actually a reversal of the trends noted by Schelske and Stoermer (1971) (1972), of a change in the dominant algal types from diatoms to green and blue-green algae. On the average, it would be expected that within a few years in the open waters there should be a reduction in the phosphorus content of these waters. This reduction may be difficult to see because of the small levels of phosphorus normally present in these waters. However, such a decrease in the overall phosphorus loading should actually reduce algal biomass in the open waters of the lake to some extent.

Another factor which will tend to reverse the trends noted by Stoermer and Yang (1969) (1970), of the change from diatoms to green and blue-green algae associated with increasing phosphorus input and concomitant silica utilization by the diatoms, is the fact that many of the detergent companies are switching from phosphate-base detergents to silicate-base detergents. If a complete switch occurs within the next several years, it is expected that the average waste water effluent will increase in silica content by about 3-5 mg/1. While data on the silica content of waste waters in general are rather sparse, from the data available it is possible that this represents an increase of 1.5 times the average silica content of domestic waste waters. While little or no reliable data exist on the total silica budget for Lake Michigan, it can be expected that the additional input of silica should tend to further reverse the trends noted by Stoermer and Yang (1969) (1970), of changing from diatoms to green and blue-green algae.

From an overall point of view, it is abundantly clear that the steps taken in the 1968 Lake Michigan Enforcement Conference by the FWQA and the states bordering on this lake to reduce the phosphorus input by 80% from waste water sources will, when they come to fruition in December, 1972, result in a significant improvement in water quality in Lake Michigan. The total biomass of algae in the nearshore and to some extent in the open waters of the lake should be decreased within a few years due to this phosphorus input reduction. Further, there should be a change in the types of algae present in the lake from those which are normally indicative of higher fertility to the diatoms indicative of oligotrophic waters.

The discharge of waste heat from steam electric generating stations located on Lake Michigan is sometimes alleged to accelerate the eutrophication of the lake (Department of Interior, 1970). Conservation activist groups such as BPI (1972) claim that a cataclysmic change in water quality-eutrophication in Lake Michigan will occur in the lake unless steps are taken to eliminate waste heat input to the lake. According to BPI (1972) the current delicate balance of Lake Michigan will be tripped in favor of a rapid acceleration in the degree of eutrophication of the lake by the addition of heat from steam electric generating stations that are scheduled to begin operation within the next few years. BPI has intervened in the AEC licensing hearings for each of the nuclear steam electric generating stations that are scheduled to begin operation in the near future on Lake Michigan. BPI has filed almost identical statements of contention opposing the operation of these plants with once-through cooling as a means of waste heat disposal. However, careful examination of the situation shows that the BPI contentions for intervention on the basis of accelerated eutrophication are not technically correct from at least two points of view. First, Lee and Veith (1971) have reviewed the relationship between waste heat input to lakes of the Lake Michigan type and have shown that the currently planned waste heat input to Lake Michigan is small compared to the heat assimilatory capacity of the lake, resulting in a very localized heating of the water in the area immediately adjacent to the points of discharge. Further, as discussed by Lee and Veith (1971), the time-temperature relationship in the heat discharge plume will be sufficiently small so that no significant increase in planktonic algal growth will occur. Nor will there be a change in the type of planktonic algae.

The second reason why the basic premise that the BPI contention that the addition of waste heat from existing or soon-to-operate steam electric power plants is incorrect has been described in this paper. BPI uses as a basis for the delicate balance of the eutrophication of Lake Michigan the results of Stoermer and Yang (1969) (1970) and Schelske and Stoermer (1972). However, fortunately steps were taken over four years ago to reverse the trend of decreasing silica in Lake Michigan by greatly limiting the phosphorus input to the lake by December, 1972. The cataclysmic changes in water quality to Lake Michigan predicted by BPI (1972) did not properly reflect the steps that had already been taken by the water pollution control regulatory agencies to minimize phosphorus input to Lake Michigan. These cataclysmic changes in water quality in Lake Michigan will not take place. Instead, there should be a noticeable improvement in water quality over the next few years.

It is of interest to speculate about the potential benefits which may be derived as a result of reducing the phosphorus input to Green Bay from waste water sources on water quality in the Bay. There are several water quality problems in southern Green Bay. One of the most significant problems is the low dissolved oxygen concentrations that occur in the southernmost part of the Bay. These problems arise primarily from discharge of untreated or partially treated wastes emptied into the Fox River having a high BOD content. While the discharge of phosphate into southern Green Bay does tend to increase the oxygen demand of sediments due to the death and decay of algae and other aquatic plants, it is generally felt that the BOD added to the waters from algal decay is small compared to the BOD input to southern Green Bay from waste water sources. Therefore, reduction of the phosphate input to southern Green Bay will have little or no effect on the BOD problems of the southern Bay. What is needed to solve the oxygen demand problem from southern Green Bay is BOD removal from waste water sources. It should be noted, however, that one of the benefits of some phosphate removal processes from waste waters is a concomitant increased removal of BOD from the effluent. Therefore, while phosphate removal will not directly affect the oxygen demand problem, indirectly, it will help to minimize this problem in southern Green Bay.

The other important water quality problem in Green Bay is the excessive growth of planktonic and attached algae and in certain locations macrophytes or water weeds. The high phosphorus concentrations in Green Bay are directly contributing to the excessive amounts of aquatic plants in the Bay. Based on the estimates of phosphorus sources by Sridharan (1972), Sridharan and Lee (1972) and Jayne and Lee (1972) for Green Bay, there should be approximately a 50% reduction in the phosphorus content in southern Green Bay water and a 40% reduction in the phosphorus content of the Bay as a whole. These numbers neglect the contribution of phosphorus from the sediments and assume that the phosphorus flux to the sediments will continue to be approximately what it is today and that the other sources of phosphorus for the Bay will remain unchanged.

Currently the average concentrations of orthophosphate in southern Green Bay are approximately 0.05 mg/l P. Based on the above assumptions the average concentrations of the Bay should drop to 0.02-0.03 mg/l P. These concentrations are those which would be present after the algae and other phosphorus sinks have taken up what they need or can absorb. It is clear that since these concentrations are two to three times above the critical concentrations commonly found for the excessive growth of algae, the algae in general are not phosphorus limited and will not likely become so, as a result of reducing phosphorus input by 80% from waste water sources. Therefore, little improvement will be expected in water quality in the southernmost part of Green Bay as a result of reducing the phosphorus input into the Bay from waste water sources. In order to control excessive growth of algae in this part of Green Bay, it will be necessary to control phosphorus input from some of the more diffuse sources such as urban and agricultural runoff.

Another important water quality problem of southern Green Bay is the high turbidity present in the water. This high turbidity affects the aesthetic quality of the water and may play an important role in influencing algal growth. It is reasonable to propose, based on the observations made by Sridharan (1972) and Jayne and Lee (1972), that algal growth in the southernmost part of the Bay may be, at times, light limited. Therefore, even more profuse algal growth might be encountered if the turbidity of the Bay is reduced. This turbidity arises primarily from the suspended solids derived from municipal and industrial wastes, clastic materials derived from the drainage basin, sediments stirred up by wind, wave and organism action, detrital remains of aquatic and terrestrial plants and animals and algae.

Since it is likely that the algal contribution to suspended solids in southern Green Bay is small as compared to other sources, and since the expected reduction in algal number will likely be small as a result of removal of phosphorus from waste waters, it is reasonable to propose that the high turbidity problem of southern Green Bay will not be influenced to any significant effect by phosphorus removal from waste water sources.

While 80% removal of phosphorus from waste water discharged into tributaries of southernmost Green Bay may result in little improvement of water quality in that part of the Bay, the removals are justified based on the protection of mid and upper Green Bay as well as Lake Michigan from further water quality deterioration. The growth of algae present in the open waters of mid and upper bay and of Lake Michigan is often limited by the phosphorus content of the water. Since the Fox River and Green Bay represent one of the more significant sources of water and phosphorus for Lake Michigan, phosphorus removal from waste water sources is justified.

Future Water Quality in Lake Michigan

It is of interest to attempt to predict what the future water quality in Lake Michigan will be as a result of further urbanization of the lake's watershed. In making a calculation of this type, assumptions must be made about the rate of population growth in the Lake Michigan watershed which will contribute domestic waste waters and urban drainage to the lake.

Accurate population projections are extremely difficult to obtain. However, after contacting a variety of sources it was decided that Table 3 presents the best current estimate of the projected population in the Lake Michigan basin between now and the year 2020 (Schraufnagel, 1972; Fetterolf, 1972; and Zar, 1972). Examination of this table shows that the total population, excluding Illinois, is expected to increase by almost 6 million persons in the next 50 years. Further, the sewered population in the Lake Michigan basin, excluding Illinois, is expected to increase 6.5 million in 50 years. Illinois is excluded from these population estimates since the waste waters and most of the storm water from Chicago

Table 3

Estimated Population in Lake Michigan Watershed Excluding Illinois

Year	Population (millions)
1970	7.16
1980	7.66
2000	10.02
2020	13.05

Estimated Population in Lake Michigan Watershed Served by Waste Water Treatment Plants Excluding Illinois

Year	Population (millions)
1970	3.93
1980	4.94
2000	7.38
2020	10.44

are diverted from the Lake Michigan basin. The North Shore Sanitary District currently discharges about 30 MGD of treated waste water effluent to Lake Michigan. According to Blomgren (1972), the majority of the effluent is meeting the current Illinois 1 mg/1 P effluent standard. Further, Blomgren (1972) expects that complete diversion of the North Shore Sanitary District waste waters to the Des Plaines River will occur in 1974. This diversion will remove an additional 0.1 million pounds per year of phosphorus from the Lake Michigan basin.

Table 4 summarizes the expected changes in the phosphorus loading of Lake Michigan during the next 50 years.

It would be expected that without any phosphorus removal from domestic waste waters or a change from phosphate to nonphosphate-type detergents, approximately 30 million pounds of phosphorus per year would be entering the lake by the year 2020 over what is expected to enter the lake in 1973. However, since this waste water will be treated for at least 80-90% phosphorus removal, possibly attaining a 1.0 mg/1 P effluent, only 2.4 million pounds per year increase (assuming 90% removal) in the phosphorus is expected by the year 2020. Considering that the 0.8 million pounds of phosphorus in combined sewer overflow and the North Shore Sanitary District waste waters will have been eliminated from Lake Michigan by that time, the total waste water phosphorus load by the year 2020 should be in the order of 3.7 million pounds per year, or approximately 2.4 million pounds above the expected load for 1973 if all municipal waste water dischargers to Lake Michigan or its tributaries achieve the 1.0 mg/1 P effluent.

One of the effects of the population increase in the Lake Michigan basin, which includes not only the states of Michigan, Wisconsin, and Indiana, but also to a very limited extent, the state of Illinois, is the

Table 4

Expected Changes in Phosphorus Loading of Lake Michigan - 1973 - 2020

	Change in Load million lbs/yr
Diversion of North Shore Sanitary District	-0.1
Eliminate Combined Sewer Overflow	-0.8
Increase in Sewered Population (90% Phosphorus Removal by Year 2020)	+2.4
Increased Urban Area (Conversion of Rural to Urban Land)	+0.6
Rural Runoff Input Reduction	- magnitude unknown
Urban Runoff Input Reduction	- magnitude unknown
Improvement in Advanced Waste Treatment	- magnitude unknown
Net Change in Phosphorus Load to Lake Michigan 1973-2020	+2.1

further urbanization of the land within the drainage basin. Studies by Kluesener (1972), Kluesener and Lee (1972), and Weibel (1969) have shown that the conversion of rural land into typical urban area results in a significant increase in the phosphorus transported from the area. While the magnitude of the increase is dependent on the original land use, values ranging from 1 to 100 are typically encountered from the conversion of forest or farm lands into urban U.S.A. The urban sprawl that has dominated the population increase during the last 20 years will probably not continue to the same extent in the future with the result that, per unit increase in population, less land will probably be converted from rural to urban activity than for a similar population increase in the past.

Table 5 presents the best available estimate of the amount of land in the Lake Michigan drainage basin that will be converted from rural to urban activities in the next 50 years. Approximately 1.1 million acres of farm and forest will be converted into suburbia in this period of time. If it is assumed that the conversion from rural lands in the Lake Michigan basin to urban areas results in an 0.6 pound per acre per year increase in the phosphorus transported from an acre of land, it is computed that the urbanization of the Lake Michigan watershed during the next 50 years would increase the total phosphorus load to the lake by 0.6 million pounds of phosphorus per year in urban storm water drainage. Studies currently underway in the University of Wisconsin Water Chemistry Program are showing that a substantial part of the urban storm water drainage phosphorus is not readily available for algal growth.

From the data summarized in Table 4 it is seen that the net change in phosphorus load to Lake Michigan during the next 50 years should be in

Table 5

Estimated Areas of Increased Urban Development in the Lake Michigan Watershed

Period		Area (acres)
1970-1980		278,800
1980-2000		438,200
2000-2020		428,200
	TOTAL	1,145,200

the order of an additional 2.1 million pounds per year of phosphorus. Therefore, it is expected that without any changes in the current technology for the control of phosphorus that the total phosphorus load in the year 2020 will be approximately one half of the 1971 phosphorus load. To compensate for this increase it is likely that the technology available for the control of phosphorus will be improved significantly in this period. For example, studies by Kluesener (1972) and Cowen and Lee (1972) have shown that one of the major sources of phosphorus in urban storm water drainage is the leaching of this compound from tree leaves in the fall of the year and tree seeds and flowers in the spring of the year. These studies have shown that a much more effective street cleaning by vacuuming techniques and leaf and debris pickup than is normally achieved in most municipalities would likely reduce the amounts of phosphate derived from urban areas by a significant extent.

The amounts of phosphorus derived from rural runoff should also be reduced in the next 50 years as a result of efforts designed to minimize the loss of fertilizers from the land. Especially noteworthy in this area are the current efforts designed to greatly reduce the amounts of phosphorus derived from animal manures spread on frozen soil. Further advances in the technology of phosphorus removal at domestic and industrial waste water treatment plants should within the foreseeable future enable many treatment plants to achieve greater removal of phosphorus with a relatively modest increase in treatment cost. Therefore, it is reasonable to conclude that the total phosphorus load to Lake Michigan will not increase more than 1-2 million pounds per year during the next 50 year period.

Summary and Conclusions

The current phosphorus loading to Lake Michigan is in the order of 18 million pounds per year. If the states bordering on Lake Michigan adopt a 1.0 mg/l P effluent standard for waste waters discharged to this lake or its tributaries, there should be a 66% reduction in the phosphorus load to this lake within the next year when the new treatment practice is put into effect, with a residual phosphorus loading in the order of 6.2 million pounds per year. This reduced phosphorus loading should result in a significant improvement in water quality in the nearshore waters and to some extent in the open waters of the lake, resulting in decreased growth of planktonic and attached algae. The drastic changes that have been predicted for water quality in Lake Michigan will not take place due to the foresight of the water pollution control agencies, which at the 1968 Lake Michigan Enforcement Conference adopted the regulations which will be substantially in effect in December, 1972, requiring 80% removal of phosphorus from all waste waters entering Lake MIchigan or its tributaries. The current trend in the change from diatoms to green and blue-green algae noted in the open waters of the lake should be reversed due to the reduced phosphorus input and to some extent due to an expected increase in the silica input to the lake.

Using a rate of recovery model for Lake Michigan based on the phosphorus residence time rather than the hydraulic residence time, it is found that the phosphorus residence time is in the order of six years and that the recovery of the lake to a new steady state phosphorus level after the reduction in phosphorus input that takes place within the next year will take approximately three phosphorus residence times.

Some of the numbers which serve as the basis for the calculations presented in this paper are very poorly known, such as the amount of phosphorus contributed to Lake Michigan by precipitation and dustfall as well as the amount of phosphorus derived from urban and rural sources. It is possible that further studies might show that the values selected by the author, which are largely those values developed by the Phosphorus Technical Committee of the Lake Michigan Enforcement Conference, are in substantial error. However, errors will not change the overall conclusions of this paper, namely that it is reasonable to expect that due to the steps taken over four years ago by the Lake Michigan Enforcement Conference to limit the phosphorus input to Lake Michigan that there will be an improvement to water quality in the lake and that in the foreseeable future, i.e., the next 30-40 years, there should be no further significant deterioration in water quality in the lake.

The expected population growth in the Lake Michigan basin that will be contributing waste waters to the lake is approximately 6.5 million persons by the year 2020. This increase in population, coupled with the continued maintenance of 80-90% phosphorus removal from waste water sources and the virtually complete elimination of combined sewer overflow and control of phosphorus from urban and rural runoff, should result in a water quality in Lake Michigan remaining essentially constant for the next 30-40 years once the lake has achieved a new steady state phosphorus concentration as a result of the December, 1972, reduction of phosphorus input from waste water sources.

Acknowledgement

I wish to acknowledge the assistance of Howard Zar of the EPA, Chicago, Carlos Fetterolf of the Water Resources Commission of the State of Michigan, Jacob Dumelle and Carl Blomgren of the State of Illinois pollution control agencies, John Konrad and Pat Schraufnagel of the Wisconsin Department of Natural Resources, Tom Maloney of the EPA Corvallis, and Claire Schelske of the University of Michigan for providing me with much of the data used in this paper and for their assistance in reviewing it.

This investigation was supported by the EPA Training Grant No. 5P2-WP-184-04. Support was also given this paper by the University of Wisconsin Department of Civil and Environmental Engineering.

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DR. LEE: All right. What I want to do now is to look specifically at this decision that was made back in 1968 with respect to limiting the phosphorus input to Lake Michigan. You recall you heard previously today that back in 1968, the States bordering on Lake Michigan and the then FWQA decided that they would require an 80 percent removal of phosphorus from wastewater sources by December 1972.

Now, three questions come from that decision:

1. Will the steps taken back in 1968 bring about a significant reduction in phosphorus input and therefore result in a measurable increase in water quality?

2. What will be the rate of recovery of Lake Michigan as a result of the December 1972 limitation of phosphorus input?

3. What will be the expected increase in the phosphorus load to Lake Michigan due to further urbanization of the lake's watershed?

And it is these three questions with which I wish to address myself this evening.

Let's go to the next slide.

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Now, on this slide I have presented what I called the 1971 load data. This is the data derived by the Phosphorus Committee which shows that the wastewaters are contributing something in the order of 13 million pounds per year of phosphorus to the lake -- this is as of last year -- before any significant phosphorus input took place.

I have assumed a diffuse source. This is from urban runoff and from agricultural lands of about 3 million pounds per year. This is in accord with the 1969 data used by the Phosphorus Committee.

I have also used the Phosphorus Committee combined sewer overflow data giving a 0.8 million pounds per year load of phosphorus arising because of the problems of combined sewer overflow.

Finally, I have added in a figure of my own which gives something in the order of 1 million pounds per year of phosphorus going into Lake Michigan from atmospheric precipitation and dustfall. This gives a total load, at this time, of something in the order of 18 million pounds per year.

Now if we look at what the phosphorus load will be in 1973, assuming that we achieve the 80 percent removal of phosphorus from wastewater sources, we see that we reduce the phosphorus load from 18 million pounds down to about 7.5 million pounds, or a 58 percent overall reduction.

If we adopt the 1 mg/l effluent standard -- which I am assuming here is equivalent to 90 percent removal -- we will reduce the total phosphorus load to Lake Michigan in 1973 — if that is when the removal takes place — to 6.2 million pounds or 66 percent reduction.

Let's look at the next slide, please.

... Slide ...

There are several factors to consider when you are talking about phosphorus loads, and I want to spend just a minute on this because I think it is important to put these various types of loads in their proper perspective: perspective of availability.

There is little doubt that the phosphorus that comes into Lake Michigan from direct wastewater inputs is largely available for algal growth. Algae can grow on this phosphorus with little or no difficulty. However, a large part of the phosphorus coming in from stormwater drainage — that is, coming in from off the streets — or from rural runoff, or from atmospheric sources, is not available for algal growth. So it is not fair and proper to write phosphorus coming off of farmland as being equivalent to phosphorus coming from the streets or from wastewater sources. Each of these are different with respect to their effects on algal growth.

Where I had about 1 million pounds of phosphorus coming from the atmosphere, our own studies showed that most of this phosphorus is not available for algal growth and therefore it does not really contribute to further growth of algae in the lake.

Another point to make, I think, is with respect to wastewater discharges to streams which eventually get into the lake, where I am convinced that a large part of the phosphorus discharged to a stream -- say, like the Upper Fox River in Wisconsin -- would not be available for algal growth in Lake Michigan. By the time this phosphorus gets down to Green Bay and out into the lake, a large part of it would be converted to refractory or unavailable compounds, and this has to be considered, too.

So the most important source is the direct input to the lake from wastewater sources, and these others contribute in yet an undefined way that is certainly of lesser significance than the direct input.

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Now we are going to see a very dramatic decrease from the phosphorus loads. The first question that comes from this is the question of how fast will the lake recover? Well, the hydraulic residence time for Lake Michigan is in the order of 100 years. That is the filling time of the lake. For conservative chemicals like chloride or sodium, it will take several hundred years for the lake to reach a new steady state, or constant concentration, as the result of some input reduction. However, for nonconservative chemicals -- and phosphorus is highly nonconservative -- it is incorrect to use the hydraulic residence time in describing the behavior of this chemical in the lake. What should be used is the phosphorus residence time, and I have defined this very simply as the total amount in the lake divided by the input. From a figure like this, you can get an indication of how long a phosphorus molecule will reside in the lake. And it turns out that Lake Michigan, using the data available from the Phosphorus Committee, we have the phosphorus residence time in the order of 6 years -- not hundreds of years, but 6 years.

All right. We have been doing some work on modeling of behavior of phosphorus as the result of reducing the phosphorus input. And it was mentioned earlier, the work of Megard, who has done similar work for some of the other lakes in various parts of the country, and we can show that in general we talk about a 3 residence times -- 3 times the residence times -- being required for 95 percent recovery.

What this means for Lake Michigan, then, is that the lake should recover at a rate such that by about 18 years it would be at a new phosphorus level as the result of the 80 or 90 percent phosphorus reduction which will take

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place within the next year or so.

An important point with respect to this model is that we are talking about exponential rates recovery where the greatest drop occurs in the first few years after the input reduction.

And so immediately after reduction of phosphorus input, we should be beginning to see a dramatic decrease in the overall phosphorus.

Next slide.

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The next point I want to take up is the question of what happens in the future, and I want to look at the expected population and their phosphorus for Lake Michigan up to the period 2020. In other words, the next 50 years.

I have been able to collect from various sources the expected population in the Lake Michigan Basin for this period, 1970 to the year 2020. We expect to have, excluding Illinois, about 13 million people in the basin at that time. About 10.4 million people will be served by a domestic sewage system and therefore would be contributing wastewaters to the lake in the year 2020.

Next slide, please.

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In addition to phosphorus from domestic wastewaters, we also have to consider the fact that we are going to urbanize a lot of rural land with this increased population, and the estimates available to me show that we will convert about 1.1 million acres of farmland and trees and other rural areas into urban areas in the next 50 years.

Next slide, please.

... Slide ...

All right. Using these numbers, we can estimate what will be the phosphorus load to Lake Michigan in the next 50 years. What will be the change? Well, first, we have several things that are going to happen in the next few years which will decrease phosphorus inputs, in addition to the phosphorus removal that we have talked about here today.

One of these is that within 2 years we will divert the North Shore Sanitary District to the Des Plaines River, and my estimate of this is that this will take out about 0.1 of a million pounds a year of phosphorus from the lake.

We will also sometime in the next 50 years -- possibly within the next 10 -- eliminate the combined sewer overflow problem, and this will certainly reduce the phosphorus load by something in the order of 0.8 of a million pounds per year.

Now, in opposition to this, we are going to increase the population in the basin, and if we assume that we are

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going to achieve 90 percent phosphorus removal on their wastewaters — which certainly we can do for a large part of this time -- this will increase the phosphorus load -- and unfortunately there is an error on the slide; it should be 2.4 million pounds. These have been corrected in the text which you have received. So it is increased to 2.4 -- not 3.8 -- million pounds, in the next 50 years.

All right. The conversion of rural land to urban areas will increase the phosphorus load -- this is really a guess -- but there will be a small increase of something in the order of 0.6 of a million pounds.

To counteract this, I think that in the next 50 years, we are going to learn more about how to control phosphorus from rural runoff; we are going to learn how to control phosphorus from urban areas; and we are going to even make significant improvements in advanced waste treatment.

Well, if we take the net change in the phosphorus load between 1973 and -- that should be -- 2020, we come up with an overall net change in 50 years of 2.1 million pounds -- 2.1 in 50 years.

All right. We have, in 1973, an estimated load, after we achieve the 90 percent reduction, of about 6 million pounds. So we are going to add, in the next 50 years, a maximum of 2 more million pounds, to give us a total of 8 million pounds going into the lake by the year 2020, and there is no way that I could see that this could be increased above that. No one would be allowed to do things in the basin which would increase the phosphorus flux such that it would be significantly higher than that, and I am quite sure that there are many things that will lead to a reduction in the overall increase.

This means that by the year 2020, assuming that population projections are reasonably correct, we would have a phosphorus load to Lake Michigan which is less than half of the current load -- less than half of the current load to the lake.

Let's go to the last slide.

... Slide ...

Conclusions

1. It is my conclusion that the steps taken in 1968 to limit the phosphorus input to Lake Michigan will result in a significant improvement in water quality in many parts of Lake Michigan -- especially the nearshore zone -- but also to some extent in the open waters.

2. The trend to replace diatoms with green and blue-green algae should be reversed as the result of the December 1972 phosphorus limitation. This is the trend that

Dr. Stoermer just spoke of.

3. The residence time of phosphorus in the order of 6 years, and after about 3 phosphorus residence times we should be achieving a new steady state phospohorus concentration in the lake.

4. Future population trends in the Lake Michigan Basin show that the expected phosphorus load in the year 2020 will be less than half of the 1971 load.

5. Lake Michigan water quality with respect to its eutrophication will show an immediate improvement in the next 5 to 10 years, and then essentially no change for 20 to 30 years, and then with the further urbanization we should see some gradual change toward more eutrophic conditions by the year 2020.

Thank you.

MR. MAYO: Any questions, gentlemen?

MR. BRYSON: I have a couple of questions.

Earlier in your presentation, you said that runoff from farmland -- phosphorus is not available in that level -- two questions.

DR. LEE: No, I didn't say it was not available, it is --

MR. BRYSON: Reduced --

DR. LEE: -- reduced availability. Yes, you are quite correct.

MR. BRYSON: Two questions then: 1) what is the source of the phosphorus in there; is it fertilizer and animal wastes; and 2) is its unavailability due to the fact that it is bound up in the soil and that --

DR. LEE: Yes.

MR. BRYSON: I'll just stop there.

DR. LEE: With respect to rural runoff you have to clearly state whether you are dealing with animal wastes or from fertilizers on the soil. The animal waste situation is such that in general it is much more available.

For example, dairy manure, and so forth, is much more available than the phosphorus applied in the cornfields. And the primary reason for the cornfield phosphorus not being available is that it is tied up in the measurements of the solid materials. Phosphorus is primarily transported in solids and it is tied up there. It is simply not available for algal growth.

MR. BRYSON: Do you have a feel for the availability in your estimation?

DR. LEE: No, we are working on that very much at this time.

MR. BRYSON: What are you talking? 10 percent, 20 percent, 80 percent?

DR. LEE: Well, I tried to get that figure. I have a student whose Ph.D. degree thesis is devoted just to this, and we are doing, on behalf of EPA a lot of work on Lake Ontario, devoted just to this topic. At this time we really can't give a number. The Agriculture people use a number of 10 percent. If you go back and try to understand the origin of that number, you find there is not much basis for it. But I can't really give you a number. Next year at this time I think we will have a pretty fair handle on the Lake Ontario Basin.

MR. MAYO: Any other questions, gentlemen?

MR. CURRIE: Yes.

Mr. Chairman.

MR. MAYO: Mr. Currie.

MR. CURRIE: First of all, Dr. Lee, where did you get the figure of 6 years residence time for phosphorus?

DR. LEE: This is based strictly on determining the total amount in the lake and the rate of input. You simply divide the two numbers.

The hydraulic residence time, you look at the volume and the flow in.

MR. CURRIE: Now you say that in something like 25 years there will be a new equilibrium concentration reached. At what level?

DR. LEE: Well, this is very difficult to be precise about because we do have minor shifts in the exchange with the sediments as a function of load.

I think that you can -- as a first approximation -- predict we are going to reduce the phosphorus input by 50 to 60 percent; we would certainly reduce the algal growth by -- I will give you 25 percent.

In other words, take that -- some of it to account for possible recycling of the sediments which will change as a function of load.

But overall, certainly the maximum difference you could get is 58 percent on the 80 percent removal, assuming -- which indicates that phosphorus is limiting -- that all of the phosphorus that went in was available, and so forth.

MR. CURRIE: Would you expect a linear relationship between reduction in input and reduction in concentration in the lake itself?

DR. LEE: No. It is more complicated than that. There are a lot of other reactions proceeding but, as I say, I am giving in between the 50 to 70 percent overall, giving, say, 25 percent reduction as a first guess.

MR. CURRIE: Twenty-five percent reduction today in the algal --

DR. LEE: In the algal growth, right.

MR. CURRIE: And what percentage of a reduction in the concentration in the open waters of the lake?

DR. LEE: Oh, I am using the same figure. I am assuming the algae is -- according to Schelske's work and Stoermer's work -- directly dependent upon phosphorus and that we can use as a first approximation a stoichiometry of algae where you can predict fairly precisely what growth will occur under these conditions.

MR. CURRIE: Thank you.

MR. MAYO: Any other questions, gentlemen?

MR. McDONALD: Yes.

I would like to know, Dr. Lee, if you and Dr. Stoermer talk to each other because the divergency between your two statements when you are talking about the same body of water is really striking.

DR. LEE: Well, I am not sure that -- I mean I fully accepted and strongly supported his observations of the changes that have occurred. The question comes in in terms of trying to interpret what is going to occur in the future and -- well, this is my game. I am concerned with trying to control water quality and trying to predict what is happening. We are doing a lot of work now in this area of predicting, and I think we have gained sufficient experience, based on Lake Washington and based on the Lower

Madison Lakes, so that we begin to get some confidence in our ability to predict what will happen when we reduce nutrient inputs into lakes.

MR. McDONALD: Well, if this is your game, then you feel confident that the committee's report is going to protect the lake in terms of phosphorus.

DR. LEE: Yes, I do. I think the steps in 1968 were the correct steps.

MR. McDONALD: Well, I would say you are at marked divergence with Dr. Stoermer on that.

Why do you think this is?

DR. LEE: I can't give you the reasons for Dr. Stoermer's basis. I have given you my basis for this.

You look at the numbers. They are laying out there for you to review.

MR. McDONALD: Well, I know. I just wondered whether you two had had any discussions yourselves in trying to reconcile some of these differences.

DR. LEE: No, we have not discussed this paper by me, which was written last week as a result of receiving the committee report. As soon as I received the report, I said I would use these numbers in the Lake Michigan Basin because we are doing the same kinds of things on other lakes.

MR. MAYO: Mr. Frangos.

MR. FRANGOS: Yes, Professor Lee, you talk about the 1968 recommendations. At least in your translation of the committee report, we have gone from 80 percent to 90 percent reduction — if that is how 1 mg/l is translated. Would you care to comment on what that incremental reduction in algal growth might be as compared with the ultimate 25 percent algal reduction as a result of the 80 percent phosphorus removal? I am trying to get a handle on what the benefit-cost relationship is.

DR. LEE: Yes. My own experience on looking at algal growth in phosphorus-limited lakes is that you can use a very simple stoichiometric model where you can predict algal growth based on the amounts of phosphorus available. So if you can change — as a first approximation, in a system like this — the phosphorus from 58 percent reduction up to 66 percent, then, as a first approximation, I would say that that is the maximum extent of the change in the algal population that you would get because of that incremental change.

It certainly will be less than that. How much less, no one can say. There is something in between.

Now there is some benefit to be derived from taking 90 percent out, and it has got to be in the order of a few additional percent reduction in algal growth.

Now that is open water figures. And when you come to near shore -- particularly when you have got point sources like wastewater sources -- you will have situations where taking additional phosphorus out would reduce the area where you might have an obnoxious *Cladophora* growth. But that is a different system. That is very difficult to predict.

MR. MAYC:. Any other questions, gentlemen?

MR. FETTEROLF: Well, I guess I would have to ask one. I would like to eat, too, but my curiosity has got the better of me.

You didn't cite any of Edmondson's work on Lake Washington, but I know you are familiar with it. You cited Charlie Powers.

What was the reduction in phosphorus load to Lake Washington which took place? Didn't they divert the sewage completely out of that lake?

DR. LEE: Yes, they did.

MR. FETTEROLF: And that happened what -- 7 years ago?

DR. LEE: Well, it happened in a series of steps during the sixties.

MR. FETTEROLF: Fred, you are predicting a quite spectacular recovery in a short term of 25 percent reduction in phosphorus and a concomitant silica increase.

Have they got that in Lake Washington yet?

DR. LEE: Oh, yes. Lake Washington recovered in just a couple of years. Charlie commented on that.

The Lake Washington case is our best evidence where you really reduced the phosphorus level significantly and they got a very significant reduction in algal growth which is tied to the current phosphorus levels.

MR. FETTEROLF: Fine.

MR. MAYO: Any other questions?

Thank you very much, Dr. Lee.

Dr. E. F. Barth.

MR. BRYSON: While Dr. Barth is coming up, let me provide a few peremptory remarks.

The Technical Committee is recommending that the maximum concentration limit for municipal and industrial effluents be 1 mg/l. This naturally will raise questions as to: Can you achieve those levels readily in a treatment process?

Dr. Barth is in our Advanced Waste Treatment Program in Cincinnati -- EPA's Advanced Waste Treatment Program -- and he is here to address that specific question.

Dr. Barth.

STATEMENT OF DR. E. F. BARTH,
NATIONAL ENVIRONMENTAL RESEARCH CENTER,
ADVANCED WASTE TREATMENT LABORATORY,
CINCINNATI, OHIO

DR. BARTH: Mr. Chairman, conferees, ladies and gentlemen.

My name is Ed Barth. I am with the National Environmental Research Center in Cincinnati, Ohio, and I am with the Advanced Waste Treatment Laboratory.

The Region has asked me to make this presentation short and simple and I think I can meet those two requirements.

The title of this short recitation is "Design Considerations for Phosphorus Control."

As we know, lime, iron or aluminum compounds can be employed for phosphorus removal from wastewater.

Lime can be used either preceding or after a biological process. A 1 mgd facility at Contra Costa, California, employs lime to pH 11 for phosphorus control prior to a biological nitrification process. The 7.5 mgd South Lake Tahoe plant employs lime as a tertiary process, after the biological system. Both plants produce an effluent with 1 mg/l or less of phosphorus.

Iron or aluminum compounds can be used in primary treatment, in conjunction with polymer, to reduce the phosphorus content of the effluent. However, about 2 mg/l is the lowest residual that can be obtained by this method on a sustained basis.

The most efficient utilization of these metal salts is in combination with the biological solids of an activated sludge process or as a terminal coagulant immediately before the final settler of a trickling filter system.

To obtain a 1 mg/l residual phosphorus in the effluent, an activated sludge facility should provide for the following: injecting a 1.5 to 1.7 mole ratio of metal ion to phosphorus; maintain volatile suspended aeration solids in the range of 1,500 to 3,000 mg/l; and have adequate final settler capacity to maintain a weir overflow rate not to exceed 800 gpd/ft^2. These parameters have been extracted from the successful demonstrations of the 1 mg/l residual phosphorus level at Texas City, Texas (1 mgd); College Station, Pennsylvania (2 mgd); Milwaukee, Wisconsin (115 mgd); Manassas, Virginia (0.2 mgd); and three plants in Switzerland treating flows of 0.5 to 2 mgd.

An effluent phosphorus residual of 1 mg/l can be obtained at low-rate trickling filter plants, as currently being operated at Richardson, Texas, at a scale of 3 mgd. The important design features here are dosing the filter underdrain with a 2:1 mole ratio of metal to phosphorus, in a rapid-mix chamber, before the flow enters the final clarifier. The successful operation is due in great measure to the low overflow rate of 400 gpd/ft^2 at the final clarifier. Enhanced removals of suspended solids and BOD$_5$ are plus features of this operation.

Similar work at a high-rate filter (1.5 mgd) at Chapel Hill, North Carolina, have also shown enhanced phosphorus, solids, and BOD$_5$ removals. However, because of the high peak weir overflow rates of 1,400 gpd/ft^2, total phosphorus residuals average 2 mg/l.

This is a key consideration for phosphorus control. To obtain 1 mg/l residual total phosphorus there must be good effluent solids control. The 1 mg/l level is about the best that can be expected with conventional, adequately designed facilities. If a standard would require less than 1 mg/l, we would have to institute positive solids control by filtration; and in some cases pH control for minimum solubility of metal phosphates.

MR. MAYO: Any questions, gentlemen?

MR. BRYSON: I have one question for a matter of clarification, Dr. Barth.

DR. BARTH: Yes, sir.

MR. BRYSON: When you were reading the overflow rates you were saying "gallons per minute per square foot." The document I have has "gallons per day."

DR. BARTH: Gallons per day is correct.

MR. BRYSON: Thank you.

MR. MAYO: Mr. Purdy.

MR. PURDY: Dr. Barth, in, say, our evaluation of whether a plant is well operated, you have to arrive at some sort of a triggering mechanism as a yardstick of measurement.

The committee report recommended 1 mg/1 on a 24-hour composite, and I am assuming that they are saying that this is day-in-and-day-out, that you can accomplish this, in a wastewater treatment plant.

Does your experience indicate this or is the 1 mg/1 really scratching pretty much at the edge of our technology, and when we get into a real life operating situation, will we have days that are over that?

DR. BARTH: You are ready for the answer?

MR. PURDY: Yes.

DR. BARTH: Okay. I tried to key this whole thing to 1 mg/1. If you notice, at the end, I say 1 mg/1 is about the best we could expect. That is based on the fact that some plants — like Milwaukee — can get a half a mg/l routinely. Richardson, Texas, the trickling filter plant low rate is a half mg/l routinely. Other plants it is 1.0 mg, 1.1, 1.2, 1.3.

So when we are talking about 1 mg/l, I am generalizing here the entire experience we have.

MR. PURDY: But, say, if we were to adopt a requirement of 1 mg/l as a daily average, and that it should not exceed that at any time, we, then, would be setting an objective that — as I understand your answer to me — would not be obtained.

DR. BARTH: Now my remarks are based on experience from plants that are operating now. You will notice in the text it said "adequately designed plants." This means if you want 1 mg/l, for instance, in an activated sludge facility, you will have to ensure that they do not have an overflow rate that exceeds 800 gallons per day per square foot; they do dose with a 1.7 mole ratio of metal to phosphorus 24 hours a day.

MR. PURDY: One additional question: To move from the 80 percent to the 90 percent removal will require, say, a significant increase in the quantity of chemicals used or merely more positive control of the suspended solids?

DR. BARTH: In order to go from the 80 to 90 percent — essentially we are discussing averages here today — with a 10 mg/l input, it is the difference between a 2 mg/l residual and a 1 mg/l residual.

If we have the adequate designed facilities, this simply means a small increase in the chemical dosage if our final settler has a capacity of 800 gpd/ft^2.

In order to achieve 80 percent removal, we routinely dose at about a 1.2 mole ratio of metal to phosphorus. If we want to boost that up to 90 percent and obtain a 1 mg/l residual, we will have to boost the chemical dose up to near 1.7 moles of metal to phosphorus.

MR. PURDY: So really from the standpoint of cost, we are speaking largely operating cost and not additional investment in capital.

DR. BARTH: That is correct, sir; yes, sir.

MR. PURDY: Thank you.

DR. BARTH: Thank you, sir.

MR. MAYO: Any other questions, gentlemen?

MR. FRANCOS: Yes.

We are talking about a 50 percent increase in chemicals?

DR. BARTH: No, sir. We are going from a 1.2 mole ratio up to a 1.7 -- that is a half out of roughly -- 20 percent increase roughly -- from a 1.2 mole ratio to 1.7.

MR. FRANGOS: Five-tenths.

MR. MILLER: It is .5 out of 1.2.

MR. PURDY: It is a 40 percent increase.

DR. BARTH: It is about 40 percent.

MR. MAYO: Any other questions, gentlemen?

MR. BRYSON: I am confused. Did we leave it at about 40 percent increase in chemical addition?

DR. BARTH: I thought I made that choice.

MR. BRYSON: Okay. Thank you.

MR. MAYO: Any other questions, gentlemen?

Thank you, Dr. Barth.

We have one final statement. Mr. Thomas Dustin, Indiana Izaak Walton League.

STATEMENT OF THOMAS E. DUSTIN,
INDIANA DIVISION, IZAAK WALTON LEAGUE OF AMERICA,
HUNTERTOWN, INDIANA

MR. DUSTIN: Mr. Mayo and Perry Miller, I do want to thank you for your courtesy in letting me appear today since I wouldn't be able to come later in the week. And because the hour is late, I know everyone wants to get home,

T. Dustin

I will skip over the boilerplate other than to announce on the record that I am Tom Dustin. I am Executive Secretary of the Izaak Walton League.

My testimony is mainly based on the apparently forgotten remedy here today dealing with the statutory control of phosphorus, and page 2 of the statement which I have already turned in includes a copy of House Enrolled Act No. 1108. Essentially this is in force now and it reduced the amount of allowable phosphorus applications to 8.7 percent of phosphorus this year, and zero phosphorus by January first of this year, except for certain specialized applications which would go out on April 30 of next year.

The city of Chicago has zero phosphorus ordinance now in effect, and it is our position that all of the Lake Michigan States should enact that law as the most effective immediate means to reduce phosphorus entering the lake. The Environmental Protection Agency would, of course, also be well aware of the Izaak Walton League's full support of funding for tertiary and advanced treatment to further reduce phosphorus, but it is our position that the most effective priority is to reduce it before it becomes a treatment problem.

Much has been said today about the effects of phosphorus on water quality, but few conclusions are stated as directly and clearly as those in the April 14, 1970, report of the U.S. House Committee on Government Operations. And I include that summary and recommendations in the report at this point in my statement.

I will read only one item from the conclusions. The recommendations of that report, item 1: "The manufacture and importation of detergents containing phosphorus in any quantity should end by 1972, subject to possible extension if the industry, after good faith efforts to eliminate phosphate from detergents, demonstrates to the Federal Water Pollution Control Administration (now renamed to Federal Water Quality Administration) that additional time is needed.

"This date, 1972, recommended to the International Joint Commission by the Lake Erie and Lake Ontario water pollution boards, allows the industry more than 2 years for adjustment. Even after manufacture and importation of phosphate-containing products cease, it allows the industry a reasonable period to clear its inventory. From the standpoint of environmental preservation, the ban on phosphate ought to go into effect at once. Postponement is admissible only to avoid a shortage of washing products in the market which might come about through a more accelerated deadline."

Now, with the foregoing, that I have not bothered to present orally, I have gone into some lengths on the matter of phosphates in detergents because of the extraordinary silence on this matter in the report of the Phosphorus Technical Committee to the Lake Michigan Enforcement Conference, dated August 10, 1972.

I believe this is a highly relevant matter to this hearing because you are now discussing whether or not 80 percent removal of phosphorus will effectuate substantive remedies in Lake Michigan.

I would like to -- and, of course, we are talking about 80 percent of what? Our contention, again, is that detergents should be removed before they create the problem so far as this is workable.

I would like to quote one or two portions of the report -- the Technical Committee's report -- as follows:

"... the inshore water and the Southern Basin of Lake Michigan are presently exhibiting many recognizable symptoms of eutrophication. ... phosphorus is the nutrient most critical in the regulation of biological production in Lake Michigan. ... phosphorus is limiting in the lake. ... (Cited) data clearly shows a substantial increase in phosphorus concentration during the (1956-71) period. ... phosphorus is a serious pollutant in the lake. ... the appropriate course to take on Lake Michigan is to reduce phosphorus to the lowest practical level."

T. Dustin

This does seem rather consistent with Dr. Stoermer's work done actually in the laboratory of Lake Michigan itself and not by science fiction.

The report notes the serious problem of phosphorus attached to soil particles, and correctly criticizes the almost total ineffectiveness of the Soil Conservation Service's P.L. 566 Small Watershed program in abating this source, and in stressing the SCS reliance on "dams, drainage, and channelization rather than on upstream soil conservation practices." The committee is to be commended for its recognition of the sham of these pork barrel projects, and in recommending that the Federal Government use the "leverage which is inherently present under the law to require full watershed conservation treatment on private land." The report also points out the total lack of monitoring of phosphorus from sedimentation sources.

The report cites the U.S.-Canada discussions, and the Lake Erie and Lake Ontario studies, but pointedly fails to say anything about the present Canadian restrictions on detergent phosphates, nor about the conclusion that detergent phosphates are "the most amenable to control" -- meaning elimination at the source. There is no reference to either the Chicago ordinance or the Indiana statute. These are startling omissions for the so-called "Phosphorus Technical

Committee." And I have attached a letter of September 15, 1972, to the Minister of the Environment in Canada supporting the efforts to achieve this legislation.

In placing 100 percent of its recommendations on treatment, including its commendably strong stand on soil treatment, the committee's report has the effect of relegating the many detergent phosphate laws to the wastebasket of remedial steps, and in avoiding anything but the most superficial speculation on the costs and effects of phosphorus waste disposal after treatment at point sources.

Next in my statement is a list of 8 States and 50 counties and municipalities that have enacted various forms of phosphate legislation.

No single step will produce so measurable a result than enactment by all the Great Lakes States of Indiana Public Law 174 as amended by House Enrolled Act No. 1108 earlier this year. Nothing can be done as quickly, and certainly not in the blue sky speculation that we will get a specific length of time to achieve 80 percent removal by treatment, or the equally unsupported speculation that 90 percent or more will be removable in a specified length of time on a scale that will be required.

Thank you.

(Mr. Dustin's complete statement follows in its entirety.)

MR. MAYO: Thank you, Mr. Dustin.

Do the conferees have any comments or questions?

Gentlemen, I would suggest we recess until 9:00 o'clock tomorrow morning.

(Whereupon, the conference adjourned at 7:25 p.m.)

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The Izaak Walton League of America

DEFENDERS OF SOIL, WOODS, WATERS AND WILDLIFE

September 19, 1972

To: Environmental Protection Agency
Reconvened Lake Michigan Enforcement Conference

Statement of: Indiana Division, Izaak Walton League of America
Thomas E. Dustin, Executive Secretary
1802 Chapman Road
Huntertown, Indiana 46748

Gentlemen:

We appreciate the time allocated for presentation of the Izaak Walton League's recommendations for pollution abatement in Lake Michigan. My name is Thomas E. Dustin, and I offer this testimony on behalf of the Indiana state organization of the League. For background, the Indiana Izaak Walton League includes nearly 6,000 members in 52 chapters, located in the state from the Ohio River to Lake Michigan; about 30 percent of that membership is located in the state's three Lake Michigan counties.

For the record, we fully support the Lake Michigan Federation's recommendations on thermal pollution, and I will not burden the record with detailed testimony on that question, other than to note as follows: The Indiana Izaak Walton League has called for a moratorium on all further construction on the Lake Michigan shore, until a complete evaluation study of the overall importance of this resource has been made; we have called for special appropriations for pollution abatement and sewage treatment in this basin; and have stated that use of all "hard" pesticides in its drainage basin should be prohibited. It is our view that while any one source of thermal pollution may not destroy the lake's biological community, the proliferation of present and planned future sources collectively will, because much or most of the biologically critical shallow water zones will be adversely affected. It is also our position that the pre-emption of shore line real estate by such installations as power plants and other industrial structures is no longer acceptable--with or without pre-cooling--because of esthetic and social impact, and because of the adverse hydrologic effect and influence on erosion patterns. We are perfectly aware that our views imply a considerable economic impact and reallocation of financial resources; but we contend that much of the economic impact will be favorable, and that lack of action on our proposals will in the longer run cost far more, and that it will be the public taxpayer who picks up the bill.

I will concentrate much of my testimony on the question of phosphorous contro and the succeeding page consists of the Indiana statute now in force.

THIS LETTERHEAD PRINTED ON RECYCLED PAPER TO SAVE FOREST RESOURCES

HOUSE ENROLLED ACT No. 1108

AN ACT to amend IC 1971, 13-1 concerning prohibitions on the sale and use of certain detergents.

Be it enacted by the General Assembly of the State of Indiana:

SECTION 1. IC 1971, 13-1-5.5-2, as added by Acts 1971, P.L. 174, SECTION 1, is amended to read as follows: Sec. 2. On or after January 1, 1972, it shall be unlawful to use, sell or otherwise dispose of any detergent containing more than eight and seven tenths percent (8.7%) of phosphorus by weight, expressed as elemental phosphorus, in any manner or in any location in this state or into the boundary waters of this state from a source within the state. The concentration of phosphorus by weight expressed as elemental phosphorus in any detergent shall be determined by the current applicable method prescribed by the American Society for Testing and Materials (A.S.T.M.).

SECTION 2. IC 1971, 13-1-5.5-3, as added by Acts 1971, P.L. 171, SECTION 1, is amended to read as follows: Sec. 3. On or after January 1, 1973, it shall be unlawful to use, sell or otherwise dispose of any detergent containing more than zero percent (0%) phosphorus by weight in any manner or in any location in this state or into the boundary waters of this state from a source within the state. The concentration of phosphorus shall be determined as provided in Sec. 2. It is further provided that this chapter shall not apply until after April 30, 1973, to detergents manufactured for use in machine dishwashers, dairy equipment, beverage equipment, food processing equipment, hospital and health care facilities or any use in which the phosphorus or phosphates are not permitted to enter any public or private sewer or be disposed of in the natural environment.

SECTION 3. Whereas an emergency exists for the more immediate taking effect of this act the same shall be in full force and effect from and after its passage.

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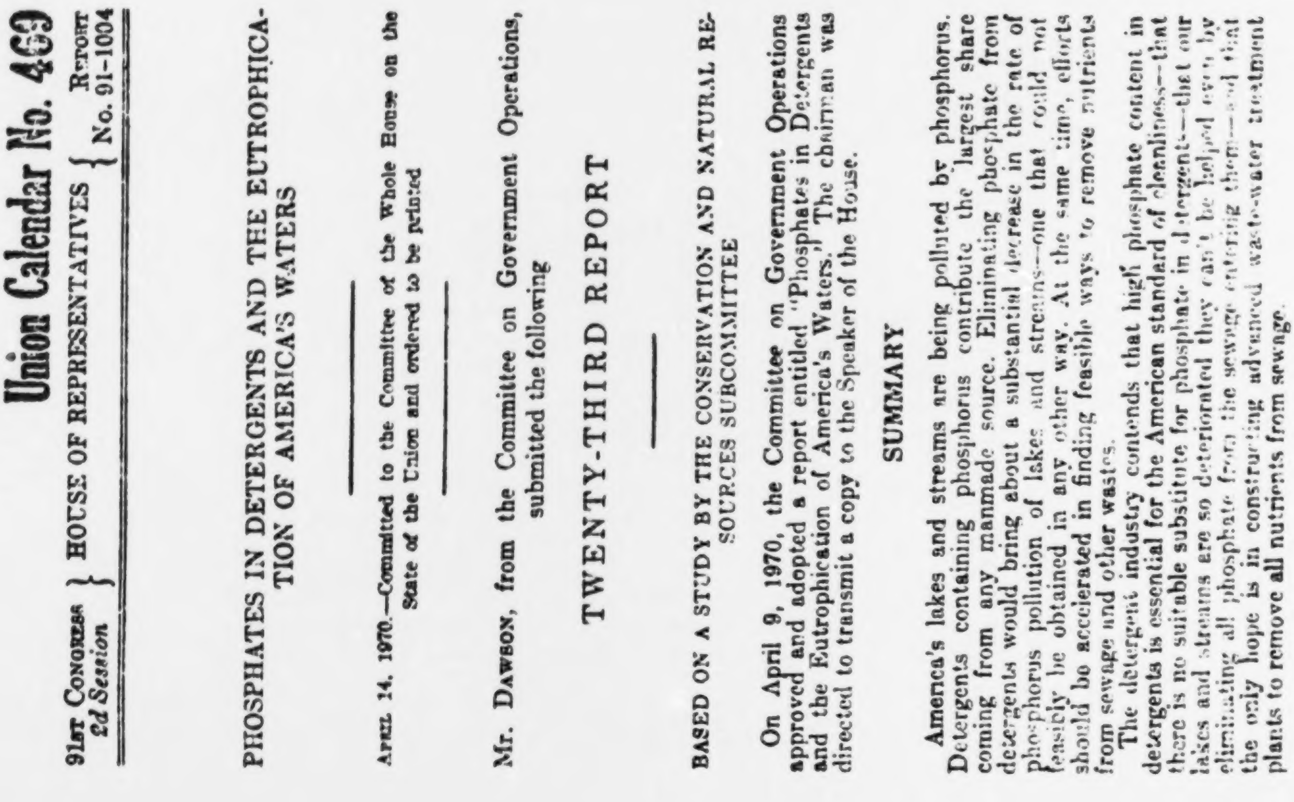
The City of Chicago has a 0% phosphorous ordinance now in effect; and it is our position that all of the Lake Michigan states should enact the Indiana law as the most effective means to reduce phosphorous entering the lake. The Environmental Protection Agency would of course be well aware of the Izaak Walton League's full support of funding for tertiary and advanced treatment to further reduce phosphorous, but it is our position that the most effective step is to reduce it before it becomes a treatment problem.

Much has been said and debated about the effects of phosphorous on water quality, but few conclusions are stated as directly and clearly as those in the April 14, 1970 report of the U. S. House Committee on Government Operations, and I include the Summary and Recommendations of that Report at this point in my statement.



Union Calendar No. 469

91st Congress } HOUSE OF REPRESENTATIVES { Report
2d Session } { No. 91-1004

PHOSPHATES IN DETERGENTS AND THE EUTROPHICATION OF AMERICA'S WATERS

April 14, 1970.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. Dawson, from the Committee on Government Operations, submitted the following

TWENTY-THIRD REPORT

BASED ON A STUDY BY THE CONSERVATION AND NATURAL RESOURCES SUBCOMMITTEE

On April 9, 1970, the Committee on Government Operations approved and adopted a report entitled "Phosphates in Detergents and the Eutrophication of America's Waters." The chairman was directed to transmit a copy to the Speaker of the House.

SUMMARY

America's lakes and streams are being polluted by phosphorus. Detergents containing phosphorus contribute the largest share coming from any manmade source. Eliminating phosphate from detergents would bring about a substantial decrease in the rate of phosphorus pollution of lakes and streams—one that could not feasibly be obtained in any other way. At the same time, efforts should be accelerated in finding feasible ways to remove nutrients from sewage and other wastes.

The detergent industry contends that high phosphate content in detergents is essential for the American standard of cleanliness—that there is no suitable substitute for phosphate in detergents—that our lakes and streams are so deteriorated they can't be helped even by eliminating all phosphate from the sewage entering them—and that the only hope is in constructing advanced waste-water treatment plants to remove all nutrients from sewage.

(1)

The detergent makers, through the Joint Industry-Government Task Force on Eutrophication, have effectively delayed remedial action by the Federal Water Pollution Control Administration concerning the continuing phosphorus pollution of America's waters.*

The committee concludes that the continuing phosphate damage to our lakes and streams requires immediate reduction, and early elimination, of phosphates from detergents, even if such action results in slightly less effective and more expensive washing products. Phosphorus-free detergents are within the capability of present-day technology, and replacements for the polyphosphate builder in detergents soon will be widely available.

Phosphorus fertilizes the excessive growth of algae and other aquatic weeds. As these plants die and decay they use up the oxygen in the water, cause fish to suffocate, and much of their phosphorus content is redissolved to fertilize yet another cycle of excessive plant growth. Finally, the accumulated masses of decayed vegetation fill the lake and turn it into a noisome bog.

Since the introduction of phosphate-built synthetic detergents in the 1940's, lakes all over the world that had remained clear and pure since the retreat of the glaciers have filled with slime and scum of algae. Many small lakes are already ruined; and now even such a huge body of water as Lake Erie is on the brink of destruction.

The conventional wastewater treatment plant removes very little phosphate from sewage. The cost nationwide of the advanced treatment plants necessary for near-complete phosphate removal will be very large.

About 60 percent of the phosphate in municipal sewage comes from detergents. And in some bodies of water, Lake Erie for example, this detergent phosphate content of sewage represents half or more of the total phosphate input from all sources, natural and manmade. It is constantly increasing.

Eliminating the phosphate from detergents would bring about an immediate and tremendous reduction in the phosphorus pollution of America's waters—and a consequent slowdown of their galloping putrefaction. A decrease of such promptness and massive scale could not possibly be obtained by any other means.

The phosphate in detergents is the "builder," whose principal function is to soften water. Yet the detergent industry puts exactly the same proportion of phosphate in products sold in soft water areas as in those sold in hard water areas.

At the urging of the Federal Water Pollution Control Administration, a Joint Industry-Government Task Force was set up "to make recommendations on a cooperative program to research the problem of controlling eutrophication (overfertilization) of lakes, including the role of phosphates and any possible replacements." At the task force's organization meeting on July 31, 1967, the then Secretary of the Interior, Stewart L. Udall, stated:

> We ask that the soap and detergent industry do just that—work with us to research and develop substitutes for phosphates in detergents.

The Joint Industry-Government Task Force has held some 13 meetings. It has sponsored development of a test to determine the ability of particular substances to stimulate algal growth in water (the "PAAP test"). It sent a delegation to Europe to study eutrophication on that continent. But it has done nothing to encourage the detergent makers to get the phosphorus out of their products. Indeed, the task force has expressly redefined its own objectives to eliminate all mention of either detergents or phosphates. Its most recent project is a proposed movie—designed, according to the task force's minutes, "to show that there are no quick or easy solutions to eutrophication; also to indicate that, while serious, it is not a crisis problem except in a few areas * * * to prepare the interested public for the long-range aspects of proposed solutions * * *."

Although the Joint Industry-Government Task Force was later enlarged to include representatives from Government agencies other than the FWPCA and from industries other than the detergent manufacturers, the latter have dominated the organization to an ever-increasing extent. On August 4, 1969, FWPCA Commissioner David D. Dominick issued a "guidance memorandum" to agency officials stating:

> The reduction or elimination of phosphorus from detergents is desirable in concept but undesirable for implementation *at this time* [emphasis in original].

The Commissioner stated that reducing the phosphate content "would undoubtedly" cause its replacement "with some substitute material [which] could cause other, even more severe, pollutional effects in receiving waters." In effect, the contention was that a known pollutant should not be banned because it "could" be replaced by something worse.

The committee held intensive hearings on December 15 and 16, 1969, and has intensively studied the scientific and technical literature concerning eutrophication, phosphates, and detergents. The committee concludes that getting the phosphorus out of detergents would surely retard the eutrophication of our lakes.

The committee recommends that the phosphate content of detergents be reduced in phases, starting immediately, and that all phosphorus be eliminated from detergents within 2 years. In the meantime, the committee suggests that if consumers in soft-water areas are informed which brands of detergents contain phosphate in excess of the amount needed by local water conditions, and discouraged from using those brands, substantial reduction in phosphorus pollution can be achieved immediately, without sacrifice of cleanliness.

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*Note. The Federal Water Pollution Control Administration was renamed the Federal Water Quality Administration by sec. 110 of the Water Quality Improvement Act of 1970 (Act of Apr. 3, 1970; Public Law 91-224). Both names are used in this report require affirmatively that the relevant information be presented on the package in a coherent and meaningful form and with reasonable uniformity.

* * * * * * *

Out of all these hearings there has emerged a pattern of marketing practices which the committee believes have substantially impaired the fair and efficient functioning of consumer commodity marketing. In particular, the hearings identified certain undesirable conditions and practices to which this legislation is principally directed. They include—

* * * * * * *

(c) Insufficient or nonexistent ingredient information, such as the failure to disclose the percentages of costly and inexpensive ingredients *or active and inert ingredients.* (Emphasis supplied.)

Section 10 of the Act (15 USC 1459) defines "consumer commodity" to mean "any food, drug, device, or cosmetic (as those terms are defined by the Federal Food, Drug, and Costmetic Act), and *any other article, product, or commodity* of any kind or class which is customarily produced or distributed for sale through retail sales agencies or instrumentalities *for consumption by individuals, or use by individuals for purposes of personal care or in the performance of services ordinarily rendered within the household, and which usually is consumed or expended in the course of such consumption or use.*" (Italic supplied.)

This provision plainly applies to soap and detergents.[41]

The committee believes that listing the ingredients of detergents on the labels of detergent packages, "in order of decreasing predominance," will substantially "facilitate value comparisons" as to this particular consumer commodity. The consumer, in making such comparisons, is concerned not only with the weight, size, and volume of the contents of each product from the standpoint of price, but also with the product's expected performance and quality. If a consumer who lives in a soft water area is informed about the ingredients of detergents, she will be able to determine which product will perform best to meet her household needs and her desires to preserve the waters and environment in her area.

VII. PRINCIPAL RECOMMENDATIONS

The committee recommends that:

1. The Manufacture and importation of detergents containing phosphorus in any quantity should end by 1972, subject to possible extension if the industry, after good faith efforts to eliminate phosphate from detergents, demonstrates to the Federal Water Pollution Control Administration (now renamed to Federal Water Quality Administration) that additional time is needed.

This date, 1972, recommended to the International Joint Commission by the Lake Erie and Lake Ontario water pollution boards, allows the industry more than 2 years for adjustment. Even after manufacture and importation of phosphate-containing products cease, it allows the industry a reasonable period to clear its inventory. From the standpoint of environmental preservation, the ban on phosphate ought to go into effect at once. Postponement is admissible only to avoid a shortage of washing products in the market which might come about through a more accelerated deadline.

2. The manufacturers of detergents should promptly begin substantial reductions of the phosphate content in their products, replacing heavy-phosphate-content detergents, as present stocks are exhausted, with new reduced-phosphate detergents.

3. Phosphate (enzyme) pre-soaks should be removed from the market.

The enzyme presoaks are misnamed. They contain two-thirds or more phosphate. In reality, they are phosphate presoaks. Designed to be followed by another wash with a high-phosphate detergent, they double the phosphate pollution from each load of laundry. They ought to be banished from the market. They were marketed only within the past 2 or 3 years and therefore cannot be said to be "essential" for maintaining the American standard of sanitation. The cost in destruction of America's lakes and waters that these products do far exceeds their trivial contribution to the advancement of cleanliness.

4. Pending complete elimination of the phosphate builder, detergents should be formulated for soft or hard water and marketed in the respective soft or hard water regions with proper and informative instructions.

5. The Federal Water Quality Administration should conduct a continuing education campaign to inform household consumers and laundries of the pollutional effects of phosphates and other detergent constituents and to help them choose washing products containing the minimum amounts of potentially polluting ingredients necessary to get their wash clean.

6. The Federal Trade Commission should, in order to facilitate value comparisons by the American consumer, promptly promulgate regulations under section 5(c) of the Fair Packaging and Labeling Act requiring manufacturers of detergents which consist of two or more ingredients to list on their package labels each ingredient contained in the packages, in order of decreasing predominance. Unless the product is completely free of phosphorus and other water pollutants, the label should plainly state whether it is for use in hard water or soft water, and if it is for use in hard water, the label should contain a warning against use in soft water.

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[41] [illegible] includes both soap and detergents. [illegible] Federal Food, Drug, and Cosmetic Act [illegible] Fair Packaging and Labeling Act [illegible] only to articles [illegible] and represented only [illegible]

7. The present Joint Industry-Government Task Force should be immediately abolished. In its place, a new broadly representative action group should be set up to accomplish the specific purpose of expediting the change-over to phosphorous-free detergents. The action group should include independent consultants, State and local water quality experts, and representatives of the public, as well as representatives of the detergent and chemical industries and the Federal Government.

8. The Federal Water Quality Administration should support both research and large-scale demonstration projects for development of effective low phosphorus or phosphorus-free detergents, while simultaneously studying their possible water pollution effects. Licenses to use any invention relating to such detergents developed with the aid of Government funds should be made available without discrimination to all responsible manufacturers, on reasonable royalty, or royalty-free, basis.

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Now I have gone to some lengths on the matter of phosphorous in detergents because of the extraordinary silence on this matter in the Report of The Phosphorous Technical Committee to the Lake Michigan Enforcement Conference, of August 10, 1972. There is much to commend this Report, but also much to criticize; and I would like to quote some portions of it with comment:

"...The inshore water and the Southern Basin of Lake Michigan are presently exhibiting many recognizable symptoms of eutrophication...Phosphorous is the nutrient most critical in the regulation of biological production in Lake Michigan...Phosphorous is limiting in the Lake...(Cited) data clearly shows a substantial increase in Phosphorous concentration during the (1956-71) period...Phosphorous is a serious pollutant in the Lake...(the) appropriate course to take on Lake Michigan is to reduce Phosphorous to the lowest practical level."

The Report notes the serious problem of phosphorous attached to soil particals, and correctly criticizes the almost total ineffectiveness of the Soil Conservation Service's PL566 Small Watershed program in abating this source, and in stressing the SCS reliance on "dams, drainage, and channelization rather than on upstream soil conservation practices." The Committee is to be commended for its recognition of the sham of these pork barrel projects, and in recommending that the Federal Government use the "leverage which is inherently present under the law to require full watershed conservation treatment on private land." The report also points out the total lack of monitoring of phosphorous from sedimentation sources. These are contentions which we have also been making for years. Frankly, we feel the lack of zeal in the PL566 projects, and in Corps of Engineers projects as well, is out of a deathly fear that they will lose some of their pork barrel constituency if their projects have to be accompanied by requirements for environmental responsibility.

However, the total silence in this report submitted to you on detergent phosphates is unforgiveable, and smacks of possible economic and political pressure from the detergent industry, such as seemed evident a year ago in the U. S. Surgeon General's famed pronouncements.

The Report cites the U. S.-Canada discussions, and the Lake Erie and Lake Ontario studies, but pointedly fails to say anything about the present Canadian restrictions on detergent phosphates, nor about the conclusion that detergent phosphates are "the most amenable to control". There is no reference to either the Chicago ordinance or the Indiana statute. These are startling omissions for the so-called "Phosphorous Technical Committee". (See Canadian Minister of Environment letter of September 15, 1971, attached)

In placing 100% of its recommendations on treatment, including its commendably strong stand on soil treatment, the Committee's report has the effect of relegating the many detergent phosphate laws to the wastebasket of remedial steps, and in avoiding anything but the most superficial speculation on the costs and effects of phosphorous waste disposal after treatment at point sources.

To underscore the importance placed on removing phosphorous before it becomes part of the huge cost of treatment, and in addition to the nation of Canada, the state of Indiana, and the city of Chicago, the following are cited: Connecticut, Florida (enabling), Maine, Minnesota (enabling), New York, and Oregon; and also in Florida: Lake County, Dade County includi Miami, Orange County, Pinellas County, Pembroke Pines; and in Illinois: Aurora, Chicago Heights, Elgin, Elmwood Park, Franklin Park, Harwood Heights, Hillside, Joliet, Kankakee, Lake County, Lombard, Niles, Park Forest and Skokie; and in Maine: Bridgton, Kennebunkport, Naples; in Michigan: Detroit, Flint, Grosse Point, Grand Rapids, Ypsilanti, and Kalamazoo; Prince Georges County in Maryland; Erie County, New York, including Buffalo; also in New York: Suffolk County, Bayville and Syracuse; nine cities in Belknap and Carroll counries of New Hampshire; in Ohio: Akron, Berea, Brook Park, Euclid, Independence, Painesville; Block Island in Rhode Island; and Madison, Wisconsin. And all that was as of August 2, 1971; in all probability, more areas have since been added.

Yet the Technical Committee, consisting of water pollution control officia of the Lake Michigan states saw fit not even to mention limiting detergent phosphates among the necessary steps to reduce the acknowledged increase in phosphate loading of Lake Michigan and the other Great Lakes.

We hope the Environmental Protection Agency will suffer no such lapse in its reasoning, or in recognizing the great need to reduce phosphorous entering Lake Michigan by restricting it at the grocery shelf in the warehouses of industrial and institutional suppliers.

No single step will produce so measurable a result than enactment by all the Great Lakes states of Indiana Public Law 174 as amended by HEA 1108 earlier this year. Nothing can be done as quickly. Every other needed step is uncertain as to time of implementation and efficacy, though all steps should be taken on the very best schedule without the loopholes and escape clauses proposed by the Technical Committee, such as the test of "economic reasonableness", whatever that is.

Thank you for the opportunity to appear and testify.

Thomas E. Dustin, Executive Secretary
Indiana Division, Izaak Walton League of America, Inc.

Minister
Environment Canada

Ministre
Environnement Canada

Ottawa, Ontario
K1A 0H3

AIR MAIL

Mr. Thomas E. Dustin,
Executive Secretary, Indiana Division,
Izaak Walton League of America, Inc.,
1802 Chapman Road,
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U.S.A.

SEP 15 [illegible]

Dear Mr. Dustin:

I am pleased to reply to your letter dated August 25, 1971, addressed to the Prime Minister, with respect to the control of phosphorus concentration in cleaning agents.

The legislation you refer to is known as the Phosphorus Concentration Control Regulations made by the Governor in Council pursuant to Section 19 of the Canada Water Act. One copy each of the Regulations and of the Act is enclosed for your reference.

These regulations became effective August 1, 1970, and limit phosphorus pentoxide content in laundry detergents to a maximum of 20 percent by weight. Further reduction of the phosphate level in detergents is required for adequate protection of the environment and I have recommended to our Government that this 20 percent maximum be reduced to a 5 percent maximum effective December 31, 1972 (copy of news release announcing this recommendation is enclosed).

Summary background material on this subject is contained in the enclosed copies of the paper entitled "Development of Nutrient Control Policies in Canada", and of Technical Bulletin No. 48, which now is being printed in finished form. Both of these documents were prepared under the direction of Dr. A.T. Prince, Director of the Inland Waters Branch of my Department.

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In response to your request for a copy of the legislative background or hearing record, I am having forwarded to you by surface mail, a set of the Minutes of Proceedings and Evidence of the Standing Committee on National Resources and Public Works, which considered and reviewed the Canada Water Act in detail at numerous meetings from December 12, 1969, to May 7, 1970. In our Parliamentary system, legislation is referred to the appropriate Standing Committee for detailed consideration and report back to the House of Commons for adoption, together with any amendments considered necessary by the Committee.

I can well appreciate your League's interest in, and active support of, the phosphate limiting law passed by your State Legislature. My appreciation of your League's concern is enhanced by the fact that your State is one of those bordering on the Great Lakes, which as you know are the focus of attention by Federal and State authorities in both our countries, in view of the massive pollution problems affecting these lakes.

During your examination of the enclosures, you will note references to the Department of Energy, Mines and Resources and to the Department of Fisheries and Forestry. Our Government's serious concern in regard to environmental pollution led to its establishment, in June 1971, of the Department of the Environment, composed of my former Department of Fisheries and Forestry together with the Water Sector from the Department of Energy, Mines and Resources and a number of agencies and groups from other Departments, to consolidate our action in dealing with environmental pollution. The bill to establish the Canada Water Act was introduced in our House of Commons by my colleague, the Honourable J.J. Greene, in view of his responsibility for water matters at that time. Mr. Greene also recommended the enactment of the Phosphorus Concentration Control Regulations for the same reason.

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I wish your League every success in its efforts to maintain the phosphate limiting legislation enacted by your State. Efforts to preserve and enhance our environment will be successful only with the active support of the public, both directly and through the example of worthy organizations such as your League.

Yours sincerely,

Jack Davis.

Enclosures

*U.S.Government Printing Office: 1974 — 751-197